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ABSTRACT

Vocational-technical teacher education has followed a different preparation path since the Smith-Hughes Act established a separate system for vocational training. This path has been increasingly challenged by end-of-the-century changes in the workplace and new knowledge about teaching and learning. This paper reviews reform initiatives in teacher education generally and in vocational teacher education, identifying a shift from Charles Prosser's essentialist philosophy toward John Dewey's progressivism and contemporary theories of constructivism as the philosophical bases for vocational teacher education. The paper explores the following aspects of excellence in teacher preparation through a review of research: What must teachers know about teaching, learning, and subject matter? What is the subject matter of vocational education? What must teachers know about students? Where does the knowledge come from in vocational education, and how does it differ from general education? Is teaching (and teacher education) based on intuition and experience or a researchable knowledge base? What is effective teaching? How does knowledge translate into practice, and what do highly effective teacher educators need to know and be able to do to develop highly effective teachers? Principles for vocational-technical teacher education (or work-based teacher education) are elaborated, and a synthesis of reform themes from the literature emphasizes an important theme: the need for a new vision for work-based teacher education. The paper describes the following components of a model for the design of work-based teacher education: philosophical foundations, principles, standards of knowledge and practice, curriculum framework, and assessment. The design implications presented call for a bachelor's degree requirement, collaboration, a broader conceptualization of the field, professional development commissions, and a culture of lifelong learning. (SK)

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Richard L. Lynch

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Foreword

The Educational Resources Information Center Clearinghouse on Adult, Career, and Vocational Education (ERIC/ACVE) is 1 of 16 clearinghouses in a national information system that is funded by the Office of Educational Research and Improvement (OERI), U.S. Department of Education. This paper was developed to fulfill one of the functions of the clearinghouse—interpreting the literature in the ERIC database. This paper should be of interest to administrators, teacher educators, and students in teacher education.

ERIC/ACVE would like to thank Richard L. Lynch for his work in the preparation of this manuscript. Dr. Lynch is Professor and Director, School of Leadership and Lifelong Learning, University of Georgia. In his extensive career in teaching and teacher education, he has also served as Program Area Leader and Professor, Virginia Tech; as a member of the Board of Trustees and a visiting scholar for the University Council for Vocational Education. He is currently a member of the Vocational Education Standards Committee of the National Board for Professional Teaching Standards. Among his many publications are several marketing education textbooks published by McGraw-Hill and recent chapters in ***The Quality of Vocational Education*** (Office of Educational Research and Improvement) and ***Beyond Tradition*** (University Council for Vocational Education).

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Darrell L. Parks
Interim Executive Director
Center on Education and
Training for Employment

Executive Summary

Recognition of the need for substantive change in vocational teacher education has been growing in recent years. Vocational-technical teachers have followed a different preparation path since the Smith-Hughes Act established a separate system for vocational training. This path has been increasingly challenged by end-of-the-century changes in the workplace and new knowledge about teaching and learning. This paper reviews reform initiatives in teacher education generally and in vocational teacher education, identifying a shift from Charles Prosser's essentialist philosophy toward John Dewey's progressivism and contemporary theories of constructivism as the philosophical bases for vocational teacher education.

The monograph explores the following aspects of excellence in teacher preparation through a review of research: What must teachers know about teaching, learning, and subject matter? What is the subject matter of vocational education? What must teachers know about students? Where does the knowledge come from in vocational education, and how does it differ from general education? Is teaching (and teacher education) based on intuition and experience or a researchable knowledge base? What is effective teaching? How does knowledge translate into practice? What do highly effective teacher educators need to know and be able to do to develop highly effective teachers?

Principles for vocational-technical teacher education (or work-based teacher education) are elaborated, and a synthesis of reform themes from the literature emphasizes an important theme: the need for a new vision for work-based teacher education. The paper describes the following components of a model for the design of work-based teacher education: philosophical foundations, principles, standards of knowledge and practice, curriculum framework, and assessment. The design implications presented call for a bachelor's degree requirement, collaboration, a broader conceptualization of the field, professional development commissions, and a culture of lifelong learning.

Information on vocational-technical teacher education reform may be found in the ERIC system using the following descriptors: Curriculum Development, *Educational Change, Educational Philosophy, Educational Principles, Labor Force Development, *Teacher Education Curriculum, *Teacher Education Programs, Teacher Effectiveness, Technical Education, Vocational Education, *Vocational Education Teachers. Asterisks indicate descriptors that are particularly relevant.

Introduction

Substantive change in vocational and technical education and the preparation of its teachers is both necessary and inevitable (Hartley, Mantle-Bromley, and Cobb 1996). Changes needed in vocational education programs or in the education needed by the vast majority of students who, in all likelihood, will not complete a baccalaureate degree have been quite well documented in many reports throughout the past decade. The breadth and depth of recommended changes in vocational education and in the education needed by nonbaccalaureate-bound students have varied from report to report, but common to most is the need to reform educational systems to be more client friendly and responsive to noncollege-bound youth, reverse the current negative image of vocational education, improve curriculum and instruction significantly for all youth—but especially the nonbaccalaureate bound, and utilize processes (e.g., through school-to-work activities and tech prep programs) through community-business-education partnerships.[1]

[1]Examples of recent reports that have called for significant changes in vocational education and/or the delivery of education for nonbaccalaureate-bound youth include Boesel and McFarland (1994); Bottoms, Presson, and Johnson (1992); Carnevale, Gainer, and Meltzner (1990); Council of Chief State School Officers (1991); National Center on Education and the Economy (1990); Secretary's Commission on Achieving Necessary Skills (1991); William T. Grant Foundation Commission on Work, Family, and Citizenship (1988); and Wirt et al. (1989).

At the secondary and postsecondary levels of education, some progress was made in the late 1980s and early 1990s toward improved vocational and technical education and/or other education programs targeted to noncollege-bound youth (e.g., school-to-work). In the 1994 National Assessment of Vocational Education, Boesel and McFarland noted that education systems had experienced increased development of performance standards and measures for vocational students, some integration of academic and vocational education, and implementation of tech prep programs. Further, as a result of these significant initiatives, students' improved cognitive skills, broad technical skills, and higher levels of education had paid off in the labor market (Boesel and McFarland 1994).

Nevertheless, Boesel and McFarland found that more needed to be done and recommended that educators—

- improve and expand such initiatives as broad career preparation for the majority of students;
- revise school programs to encompass work-oriented and related academic curriculum;
- broaden the vocational education curriculum framework from occupations and specific skill areas to industries or other more inclusive constructs;

- emphasize instruction in applications and underlying principles (in contrast to just skills and procedures);
- use work experiences and apprenticeships;
- allow room in all students' instructional programs for essential core academics;
- benchmark the programs to high academic and industry standards; and
- prepare all high school students for some form of postsecondary education or training.

Other researchers, policy groups, education agencies, and reform advocates have called for similar initiatives, including such policy changes as elimination of the general high school curriculum, infusion of work-oriented activities throughout the entire spectrum of school curricula, and standardized testing on work-related skills and knowledge. (For some analysis of national reports related to reform in vocational education, see Lynch, Smith, and Rojewski 1994).

In the very late 1980s and early 1990s, a rather interesting observation (later substantiated with data) surfaced: inservice and prospective vocational education teachers were not prepared nor being prepared to implement these changes. Further, both the teaching force in vocational education programs and the numbers of teachers being prepared to teach in vocational education were declining significantly. Boesel and McFarland (1994) reported a 9 percent decline since 1987-88 in the number of vocational teachers in the nation's secondary schools, and Lynch (1991; forthcoming-b) reported steep decline in preservice teacher education enrollment and programs in the nation's colleges and universities.

These and other reports and many discussions at state and national conferences of vocational and technical educators provided the impetus to begin the rather slow and painful process of analyzing teacher education nationwide within the context of needed changes in work-based (i.e., vocational) education, education reform in general, and teacher education reform. A few monographs, journal articles, chapters in texts, a task force report, at least one book, and conference proceedings have all highlighted the need to prepare differently the teachers of tomorrow's work force[2]. Collectively, these publications comprise the theoretical framework, research base, analyses, and creativity to advance the design or redesign of teacher education programs so as to ensure that teachers are educated well with the skills, knowledge, and dispositions to prepare their students appropriately for 21st-century workplaces.

[2]See, for example, *Beyond the Debate: Perspectives on the Preparation of Vocational Education Teachers* (1988); Dykman (1993); Griggs, Jones, and Slocum (1988); Hartley and Wentling (1996); Holder and Pearson (1995); Lynch (1991; forthcoming-b); and Lynch and Griggs (1989).

This paper is an attempt to aid practitioners in the design or redesign of vocational teacher education (work-based teacher education) programs. Much of the content in the later sections of the text is drawn heavily from the general teacher education reform literature and from studies and reports that have specifically addressed reform in vocational teacher education.

The monograph is particularly targeted to administrators and faculty at colleges and universities where vocational and technical teacher education programs are currently offered, as well as to those who are planning to integrate work force education and development programs, courses, or concepts within their current teacher education programs. Deans of education, directors or heads of teacher education, teacher educators, graduate students in teacher education, vocational educators, and others who are involved or are planning to become involved with teacher preparation may find the text useful in program design and development.

The paper begins with a brief review of some of the historical and philosophical tenets and writings that molded and shaped much of today's vocational and technical teacher education programs. It seems important for practitioners to know why college preparation, for many vocational teachers, was not considered essential in their journey to become a teacher. It also seems contextually important for many practitioners to realize that much of vocational teacher education which did take place at a college or university was developed, nurtured, and philosophically grounded in an academic unit NOT aligned with teacher education nor a college of education (Lynch 1991).

It also seems important in the design of work-based teacher education to have some understanding about the imminent educational needs of the work force as discussed in several national reports. Although never formally debated, researched, or posited to any great length, it appears as though the epistemology of vocational teacher education is grounded in knowledge needed for the workplace, knowledge of learners as workers (or vice versa), the cognitive sciences, and the knowledge bases associated with teaching and learning. Thus, some of the recent work on high quality teaching in vocational education and the reform of teacher education generally is presented as background for the redesign of work-based teacher education.[3]

[3]NOTE: The author acknowledges his looseness with some terminology in this text, particularly with such terms as vocational education, vocational and technical education, work-based education, work force education, and work force education and development. In general, the author is attempting to use vocational education and vocational and technical education in their historical and legislated context as education targeted toward job preparation. Work-based and work force education and development tend to be surfacing in the literature as the nomenclature for redesigning or developing new programs to prepare people specifically and generally for the work world.

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Finally, the text discusses implications from the reform literature for the redesign of vocational teacher education into a new form of work-based teacher education. A model is presented that addresses such areas of program design as standards, curriculum, subject matter, clinical experiences, and assessment. Other implications from the reform literature are also presented.

The Grounding and Philosophy of Vocational Teacher Education

Historically, vocational and technical education teachers have not followed the same preparation pathways or state certification rules as other public school teachers. In the early 1900s, the Federal Board of Vocational Education led by Charles Prosser believed that, if vocational teachers had to meet the same state certification requirements as general education teachers, the field would sacrifice technical proficiency. This board was of the opinion that (1) colleges and universities were ill equipped to prepare trade teachers, (2) professional teacher education was impractical for most vocational educators, and (3) vocational teachers needed practical experiences in their trade before they could teach that trade to the youth of the nation. The prevailing philosophy was that it was easier to teach an experienced tradesperson to teach than it was to teach a prospective teacher a craft, trade, or business (Lynch forthcoming-a; Prosser and Quigley 1949).

Thus, throughout history and even today, many vocational and technical education teachers were employed because of their extensive experience in a craft or occupation. Most of these alternatively certified teachers never were—nor are they today—required to meet the same academic standards as other teachers. When college degrees were considered a minimal requirement for teachers in most states and in most subjects, teachers in some vocational education programs were granted an exception. Occupational experience replaced higher levels of formal education and provided the vocational teachers with their subject matter expertise.

Based on data drawn from the 1992-93 National Assessment of Vocational Teacher Survey and from national Schools and Staffing Surveys of 1987-88 and 1990-92, Boesel, Hudson, Deich, and Masten (1994) reported that 12 percent of those teaching high school occupational courses and 15 percent of those teaching postsecondary occupational courses lack a baccalaureate degree.[1]

[1] For details of the survey and additional data on the characteristics, experiences, and opinions of secondary teachers, see Boesel, Hudson, Deich, and Masten (1994); Heaviside, Carey, and Farris (1994); and Muraskin, Hollinger, and Harvey (1994).

All academic teachers have at least a bachelor's degree. Conversely, 66 percent of all secondary vocational teachers have occupational experience, whereas only 19 percent of secondary academic teachers have occupational experience (pp. 65-66).

The tendency for vocational teachers to have less education and more work experience than academic teachers is heavily concentrated in trade and industrial education, the subject area of about 20 percent of the secondary vocational teaching force. Some 45 percent of T&I teachers have less than a bachelor's degree; in other vocational fields (e.g., agriculture, marketing, business) very few teachers have this little education. However, secondary T&I teachers do have more than twice as much occupational experience as other secondary vocational teachers—17 years, as compared to 8 years. Comparable data are not available for postsecondary faculty (Boesel, Hudson, Deich, and Masten 1994).

Alternative forms of vocational and technical teacher preparation were guided by assumptions about the purposes and goals of vocational education, for example, that masters of a trade should be the nation's teachers of that trade. This commonly accepted practice is grounded in the essentialistic philosophy of Charles Prosser, one of the forebearers of vocational education.

Early Debates over the Purpose of Vocational Education and Their Effects on Teacher Education

From the founding of the United States through the late 1800s, school curricula focused on preparing students for higher education. This is true despite the fact that only a relatively small number attended colleges and universities. However, the needs of the nation changed dramatically with the onset of the industrial revolution. Almost overnight, the nation needed a large number of workers prepared for trade and manufacturing employment positions. Around the turn of the 20th century, leaders in education and industry also began to realize that the increasingly diverse student population was not receiving the type of education they needed to prepare them for life outside of school. As synthesized recently by Sarkees-Wircenski and Scott (1995), "For most Americans, what was needed was a more practical curriculum that would prepare them for work" (p. 79).

Prosser's essentialist philosophy reflected this need for a practical education and provided the rationale for an education system that would prepare large numbers in a trade or vocation. The premise behind Prosser's essentialism is that education should train for jobs rather than train for culture. This strong emphasis on efficiency grew from the tremendous expansion of production and manufacturing, which required rapid and effective training of large numbers of people, often for single-skill jobs. Prosser believed that efficient job training would help to ensure that the nation's economic needs were met. He and Quigley (1949) explained, "On the whole, organized vocational training is an efficiency device . . . [that] can more efficiently secure social wealth" (p. 12).

Not everyone agreed with Prosser's essentialistic views of education. In the early 1900s, John Dewey and Prosser had heated debates about the goals of vocational education. Dewey emphasized that the purpose of education was to develop informed citizens for a democratic society. As a progressivist, Dewey advocated an education that prepared students in broad problem-solving skills, experimentation, and full participation in democratic processes. Dewey believed that culture should be taught through vocations, but he did not believe in teaching specific skill training:

> Such restricted specialism is impossible; nothing could be more absurd than to try to educate individuals with an eye to only one line of activity. In the first place, each individual has of necessity a variety of callings . . . and in the second place, any one occupation loses its meaning and becomes a routine keeping busy at something in the degree to which it is isolated from other interests. (Dewey 1916, p. 317)

Dewey saw vocation as a "direction of life activities"; related subjects and courses should help prepare students for change and for alternate careers.

Prosser and Dewey also squared off on educational process and governance. One of Prosser's strongest beliefs was that vocational education should be separate and autonomous from the general education system because academic faculty would not be qualified to administer vocational programs, vocational programs would not receive the proper and adequate amount of attention under usual school authorities, and vocational education needed to be protected against the tendency to train for culture rather than for jobs. Prosser also believed that

specialized vocational administration would be better able to secure support and funding for its programs without draining academic budgets (Lerwick 1979; Prosser and Quigley 1949).

In contrast, Dewey opposed the very principle of separate academic and vocational education and argued that dividing the two would result in duplication of administrative machinery. Dewey also argued that building separate systems of education would separate groups of people to be educated, serve other than the students' democratic interests, lead to conditions where students' rights might be superseded by the needs of the economy or the state, and create the undesirable condition of separating culture and the vocations (Lerwick 1979).

The enactment of the 1917 Smith-Hughes legislation decided the Dewey-Prosser debates in Prosser's favor. The tenets of this legislation were a separate system of education, training workers to meet the nation's labor needs, and training limited to preparation for jobs that require skills and academic abilities below college level (Lerwick 1979).

The Growth of Vocational Teacher Education

The philosophical underpinnings of this federal legislation and the 1917 Smith-Hughes Act itself have had profound effects—even today—on the preparation and education of teachers for the nation's vocational education programs. Charles Prosser became the first director of the Federal Board for Vocational Education, the group Congress originally charged to administer the Smith-Hughes Act and to oversee the operation of vocational education in this country.

Prosser's famous 16 theorems, often cited throughout the history of vocational education as a basis for sound and successful programs, included two directly related to vocational teacher education:

- Vocational education will be effective in proportion as the instructor has had successful experience in the application of skills and knowledge to the operations and processes he [sic] undertakes to teach.
- The only reliable source of content for specific training in an occupation is in the experiences of masters of that occupation (Prosser and Quigley 1949).

Prosser believed that teachers' trade experience would correlate with student outcomes; the more trade experience, the better the outcomes of students. College-level training for trade teachers was not expected nor considered especially desirable.

Prosser recognized that if he and the Federal Board upheld the requirement that all vocational teachers had to be occupationally competent, they would run into difficulties with college and university teacher training. Prosser believed that craftspeople would not return to campus for teacher training because they would be "more mature than the ordinary student of the normal school," they would not quit an income-producing job to acquire teacher training, and their needs would be neglected at residential campuses (Prosser and Quigley 1949, pp. 308-309). Thus, the Federal Board and Prosser concluded that state colleges and universities were not capable of preparing trade teachers. University teacher training "can contribute little or nothing to the training of teachers in vocational subjects of secondary grade" (Prosser and Quigley 1949, p. 307).

Prosser did believe in some teacher training—just not of the type usually provided in normal schools—and detailed the competencies and curriculum that should be provided. The 1917 Smith-Hughes Act and subsequent federal legislation specified that states have adequate programs of vocational teacher education and provided federal funds to do so. However, Prosser believed that the "most successful teacher training for vocational teachers . . . [is] secured by the extension method and the use of the itinerant teacher trainer" (Prosser and Quigley 1949, p. 309). He also believed that standards and curriculum had to be under the direct supervision of the state board for vocational education, which would be the equivalent of today's vocational education unit in most state departments of education.

It is interesting to note, however, that Prosser and the Federal Board apparently believed that institutions of higher education were capable of preparing agriculture and home economics teachers—provided the "boys" had "lived and worked on their parents' farms . . . and graduated from the vocational agricultural departments of county high schools" (Prosser and Quigley 1949, p. 310). As for the "girls":

> And a similar encouraging tale is being told of the college trained homemaking teacher, who domestically inclined, had her homemaking interests, insights, and practical doing and managing abilities further developed by the

> successful accomplishing of her homemaking projects under the cooperative tutorage of her mother and her high school homemaking teacher. (p. 310)

Thus, Prosser concluded that teachers of high school agriculture and home economics programs could be college trained provided they previously had completed high school agriculture or home economics classes and had practical experiences in related occupations built into their college preparation. It was the content, however, that was important, and content would be best learned either on the job or in very specific subject fields (e.g., agriculture or home economics).

Subsequent authors who helped to develop and shape vocational education over the years also touted the value of occupational experiences for vocational education teachers. Roberts (1957 and subsequent editions) identified as a major principle of vocational education, "Vocational education personnel should be occupationally competent" (p. 586). Miller (1984) also stated as an essential principle: "Teachers of vocational education are both professionally and occupationally competent" (p. 81). Mason, Furtado, and Husted (1989) believed that "prospective vocational education coordinators need the equivalent of at least two years (4,000 hours) of business or industrial experiences" (p. 124).

The professional education of vocational education teachers was not then considered anywhere near as important as occupational or trade experience or general education. The Federal Board proposed in the early years of this century that states offer short-term curriculum, extending only over a few months, either during the evening or day, as the most beneficial way in which to prepare tradespeople to enter the teaching profession. According to Beidel (1993):

> The aim of instructor training was to provide professional knowledge and experience to those who already were masters of an occupation, trade, or subject which they were to teach. General education was also included in this training, but carefully monitored to use only material to be directly reflecting and of actual value to new or prospective teachers. These individuals were accustomed to thinking in concrete rather than abstract terms and the training should pertain to their most immediate needs. (p. 6)

The belief, of course, was that teachers of vocational education subjects should consist only of individuals who were already masters of an occupation. These teachers would not be tainted with liberal arts degrees or studies nor extensive professional education courses. Teacher training was to be carefully monitored by state department personnel to ensure that only material relating directly to the occupation would be taught, that it would have immediate applicability, and that it would be taught in concrete rather than abstract terms (Lerwick 1979; Lynch forthcoming-a; Prosser and Quigley 1949).

The pattern for certifying vocational education teachers was thus fairly well put in place by the 1917 Smith-Hughes Act. Trade teachers were certified primarily on the basis of occupational experience; college degrees and general education requirements were not considered important and professional education courses were kept at a minimum and often referred to as "survival skill training" (Duenk 1989). Agricultural and home economics teachers usually completed baccalaureate degrees in subject-matter colleges and completed the general education requirements expected of their respective colleges (i.e., a college of agriculture or a college of home economics). Professional education was kept to a minimum and included only those courses minimally required for state teacher certification.

As federal legislation expanded over the years to include other occupational or program areas (e.g., business education, distributive education, technical education, health occupations), similar patterns were followed. Teachers in technical and health fields were usually credentialed on the basis of occupational experience and earned a few hours (16-200 clock hours) from short-term workshops in professional education. Typically, colleges of business (sometimes, colleges of education) offered business education and distributive education programs as these areas were included for funding in the federal legislation. Students earned subject-specific degrees (i.e., in business education or distributive education), often with minimal coursework in professional education.

Thus, vocational and technical teacher education was greatly molded and shaped over the past 75 years by the early philosophies of Prosser, the Smith-Hughes Act, the mandates of the Federal Board for Vocational Education, subsequent federal legislation, and the growth of specialized and subject-specific vocational education programs throughout the country. The primary source for initially employing trade and industrial teachers (and technical and health occupations teachers) continues to

be industry itself. Beginning teachers in 43 states may teach in T&I programs without any college credits but with considerable occupational experience (Duenk 1989). Only three states (Wisconsin, Hawaii, and Nebraska) require a baccalaureate degree for beginning certification in T&I education, seven require an associate degree, and five a baccalaureate degree for full certification (Lynch forthcoming-a).

Staff of the 1994 National Assessment of Vocational Education realized that permitting occupational experience to substitute for formal education of teachers had been an issue in vocational education for some time. Thus, Lynch was asked to review the literature on this subject, covering studies in four areas: correlation of teacher preparation with various measures of vocational teaching quality, supervisory assessments of teacher performance and competency, student achievement, and teacher competency test scores (Boesel et al. 1994). The various studies reviewed were fraught with methodological problems, chief among which was the lack of control on self-selection into different kinds of vocational teaching (Boesel et al. 1994). Also, Lynch (forthcoming-a) found the many studies lacked a "collective theoretical framework—which defines well the concepts under investigation, provides benchmark data for subsequent findings, and allows comparisons among related studies." Nevertheless, Boesel et al. (1994) concluded that the findings across many studies conducted over a period of 40 years—

> suggest that extensive occupational experience confers no particular benefits on vocational teaching, although a few years' experience has a positive impact. Formal postsecondary education is positively associated with desirable teacher and student outcomes. In short, trade and industry teachers [and others without college-level preparation] would be better off with more formal education and less occupational experience. (p. 75)

Toward the 21st Century: Skills for the Workplace

An indomitable characteristic of contemporary worklife in U.S. society today is that tasks, jobs, occupations, and careers are changing for most people in most places most of the time. As Smith (1988) noted early in one of the contemporary writings setting the context for change in vocational teacher preparation, "The changing nature of the workplace requires adaptation for

those preparing for participation in it" (p. 5). There is perhaps no message that has been clearer from the futurists—whether they are speaking from contexts as educators, scientists, businesspersons, or visionaries—than that workplaces of the 21st century and the skills needed will be significantly different than those of the 20th century; thus, the education needed must also be different.

Smith (1988) began to outline technological, demographic, socioeconomic, and work force changes affecting society as a context for vocational education and vocational teacher education. He commented that the most visible changes were in technology, most notably from computers, related hardware, and subsequent communications systems. The significant technological advancements in workplaces will have direct implications for employment especially for semiskilled and unskilled segments of the work force. Demographic trends including the changing racial and ethnic composition of the U.S. population, migration patterns, the aging population, and the increasing number of two-income families and single adult families have direct implications for *who* will be educated for the workplace. Socioeconomic issues such as globalization and accountability have implications for *what* kinds of skills need to be taught. Changes in work force patterns such as a decreasing supply of adequate labor, increased participation and status of women, increased concern for quality of work life, and changes in organizational structures in the workplace all have implications for the types of skills taught, to whom, and at what life and education stages.

Confirming the writings of Smith (1988), Pratzner and Ryan (1990) commented that these and other changes in society have direct implications for vocational teacher education: (1) changes in the skills and skill levels of workers resulting from sociotechnical (social, organizational, and technological) changes at work, (2) changes in the workplace as a learning environment for continuing and recurrent education, and (3) sociodemographic changes (the aging of the U.S. population, increasing minority populations, populations of students with special learning needs, and increasing nontraditional occupational roles).

Vocational education needs a new approach because "no longer can students at the high school level learn a specific skill that will provide job security either in the short-term or the long-term" (Tozer and Nelson 1988, p. 18). Note Hartley, Mantle-Bromley, and Cobb (1996), "[C]alls for vocational education reform have come from politicians, taxpayers, labor and the business community. All are increasingly alarmed by the lack of

preparation of youths for successful entry in the world of work" (p. 35). In 1986, the American Society for Training and Development estimated that 75 percent of all workers employed at that time needed to be retrained by the year 2000 because of changing demands of the workplace and the accompanying needed skills. It has further been estimated that a huge number of students, at least 20 million or conservatively estimated at 50 percent of the nation's 16-24 year olds, are not receiving an education to prepare them for work or to take a meaningful role as responsible citizens and family members (William T. Grant Commission on Work, Family, and Citizenship 1988). Therefore, it is important to know what kinds of education and skills are needed for the new workplaces in order to prepare teachers for providing students with the necessary prerequisites.

Two reports that have been widely circulated and publicized—*Workplace Basics* and SCANS—demonstrate that the education and skills needed for new workplaces are changing and that a gap exists between current skills of workers and those skills needed by businesses and industries. The American Society for Training and Development in cooperation with the U.S. Department of Labor conducted research with employers that resulted in *Workplace Basics*, a report that describes essential skill groupings and provides examples of successful training systems and educational practices addressing these skills (Carnevale, Gainer, and Meltzer 1990). This report states that employers want a new kind of worker with a broad set of workplace skills. Gone are the days when knowledge of a highly specific vocational skill is adequate for continued employment. The seven skills identified in *Workplace Basics* are presented in figure 1.

Organizational Effectiveness/Leadership

Interpersonal/Negotiation/Teamwork

Self-Esteem/Goal-Setting and Motivation/Employability and Career Development

Creative Thinking/Problem Solving

Communication: Listening and Oral Communication

3 Rs (Reading, Writing, Computation)

Learning to Learn

Figure 1. *Workplace Basics* seven skill groups

SOURCE: Carnevale, Gainer, and Meltzer (1990)

The Secretary's Commission on Achieving Necessary Skills (SCANS) (1991) was asked to examine the demands of the workplace and whether the nation's young people are capable of meeting those demands. Specifically, the commission was asked to advise the Secretary of Labor concerning the level of skills required to enter employment.

The SCANS report emphasized that the workplace is changing drastically and good jobs of the future will depend on people who can put knowledge to work. In the early 1970s, manufacturing jobs accounted for 27 percent of all nonagricultural employment in the United States. In 1990, manufacturing accounted for only 17 percent of these jobs. During this same time, service and retail jobs increased by 12 percent—from 32 percent of nonagricultural jobs to 44 percent of these jobs in 1990. Other changes include the reality that the workplace is increasingly becoming a two-tier service economy with the greatest number of jobs occurring in the very high-skill and the very low-skill occupations and relatively few new jobs in manufacturing (Tozer and Nelson 1988). Yet, even in those low-skilled areas, demands for computational, language, and reasoning skills are increasing. Drawing on work from the Congressional Office of Technology Assessment and the Massachusetts Institute of Technology Commission on Industrial Productivity, SCANS summarized the major differences between the traditional workplace and the leading-edge, high performance workplaces that are beginning to develop. (See Table 1.) SCANS noted that workplaces organized along the lines of traditional mass production models will no longer be viable and will be unable to survive the competition for high performance organizations that depend on the intelligence and ingenuity of their employees.

To enhance the development of such "intelligence and ingenuity," SCANS researched workplace know-how and defined five competencies and a three-part foundation of skills and personal qualities that "lie at the heart of job performance" (p. xv). These competencies and foundation skills are presented in figures 2 and 3.

Other reports have highlighted the national concern about the need to prepare students better for the workplaces of the future and have delineated proposed programs, reforms, or education design. The workplace skill and related education reports all emphasize flexibility, responsibility, self-management, and teamwork among workers and lifelong learning or continuous training to enhance workers' improvement and productivity.

Table 1
Characteristics of Today's and Tomorrow's Workplace

Traditional Model	versus	High Performance Model
Strategy		
♦ mass production		♦ flexible production
♦ long production runs		♦ customized production
♦ centralized control		♦ decentralized control
Production		
♦ fixed automation		♦ flexible automation
♦ end-of-line quality control		♦ online quality control
♦ fragmentation of tasks		♦ work teams, multiskilled workers
♦ authority vested in supervisor		♦ authority delegated to worker
Hiring and Human Resources		
♦ labor-management confrontation		♦ labor-management cooperation
♦ minimal qualifications accepted		♦ screening for basic skills abilities
♦ workers as a cost		♦ work force as an investment
Job Ladders		
♦ internal labor market		♦ limited internal labor market
♦ advancement by seniority		♦ advancement by certified skills
Training		
♦ minimal for production workers		♦ broader skills taught

SOURCE: Secretary's Commission on Achieving Necessary Skills (1991) as adapted from "Competing in the New International Economy." Washington, DC: Office of Technology Assessment, 1990.

FIVE COMPETENCIES

Resources: Identifies, organizes, plans, and allocates resources

A. *Time*—Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules
B. Money—Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives
C. *Material and Facilities*—Acquires, stores, allocates, and uses materials or space efficiently
D. *Human Resources*—Assesses skills and distributes work accordingly, evaluates performance, and provides feedback

Interpersonal: Works with others

A. *Participates as Member of a Team*—contributes to group effort
B. *Teaches Others New Skills*
C. *Serves Clients/Customers*—works to satisfy customers' expectations
D. *Exercises Leadership*—communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies
E. *Negotiates*—works toward agreements involving exchange of resources, resolves divergent interests
F. *Works with Diversity*—works well with men and women from diverse backgrounds

Information: Acquires and uses information

A. *Acquires and Evaluates Information*
B. *Organizes and Maintains Information*
C. *Interprets and Communicates Information*
D. *Uses Computers to Process Information*

Systems: Understands complex interrelationships

A. *Understands Systems*—knows how social, organizational, and technological systems work and operates effectively with them
B. *Monitors and Corrects Performance*—distinguishes trends, predicts impacts on system operations, diagnoses deviations in systems' performance and corrects malfunctions
C. *Improves or Designs Systems*—suggests modifications to existing systems and develops new or alternative systems to improve performance

Technology: Works with a variety of technologies

A. *Selects Technology*—chooses procedures, tools or equipment including computers and related technologies
B. *Applies Technology to Task*—Understands overall intent and proper procedures for setup and operation of equipment
C. *Maintains and Troubleshoots Equipment*—Prevents, identifies, or solves problems with equipment, including computers and other technologies

Figure 2. Competencies required of new workers

SOURCE: Secretary's Commission on Achieving Necessary Skills (1991), p. xvii.

A THREE-PART FOUNDATION

Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens, and speaks

A. *Reading*—locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules
B. *Writing*—communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts
C. *Arithmetic/Mathematics*—performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques
D. *Listening*—receives, attends to, interprets, and responds to verbal messages and other cues
E. *Speaking*—organizes ideas and communicates orally

Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn, and reasons

A. *Creative Thinking*—generates new ideas
B. *Decision Making*—specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
C. *Problem Solving*—recognizes problems and devises and implements plan of action
D. *Seeing Things in the Mind's Eye*—organizes and processes symbols, pictures, graphs, objects, and other information
E. *Knowing How to Learn*—uses efficient learning techniques to acquire and apply new knowledge and skills
F. *Reasoning*—discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem

Personal Qualities: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty

A. *Responsibility*—exerts a high level of effort and perseveres toward goal attainment
B. *Self-Esteem*—believes in own self-worth and maintains a positive view of self
C. *Sociability*—demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings
D. *Self-Management*—assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
E. *Integrity/Honesty*—chooses ethical courses of action

Figure 3. Educational foundation skills required of new workers

SOURCE: Secretary's Commission on Achieving Necessary Skills (1991), p. xviii.

SCANS, ***Workplace Basics***, and many other reports emphasize the need to link school-based learning and work-based learning, which was acknowledged in the federal School-to-Work Opportunities Act of 1994.

Of note, too, is that some of the literature about changes in vocational education and/or vocational teacher education have expanded the discussion of workplaces to include families and communities. Copa and Plihal (1996), for example, note that both families and communities are undergoing changes just as significant as those in the workplace. They believe work, family, and community roles and responsibilities are to be increasingly interactive and that vocational education needs to initiate significant problem solving to ensure that youth and adults can cope with changes in all three areas of human life.

Reform of Vocational Education

Beginning in the late 1980s and on into the mid-1990s, considerable attention was given to reform in vocational and technical education. More specifically, how should vocational and technical education respond to changes in workplaces and proposed related changes in education? Primary focus in the reform literature was on the high school curriculum, programs of study, structure, general treatment and preparation of students, and teacher preparation.

In summarizing reform efforts from 1983 through 1986 emanating from the "excellence movements," Weber (1992) noted several common recommendations for change:

- Provide all high school students (those who are college bound, in general education, and in vocational education) with a "core curriculum" that includes basic skills in reading, writing, computing, communicating, and reasoning;
- Strengthen curriculum requirements (e.g., require more credits) in English, mathematics, science, social studies, technology/computer science, and often foreign language, music, and art;
- Develop new partnerships between the public and private sectors to provide sustained support for education;
- Eliminate tracking of students to ensure access to high quality education for all;
- Set higher expectations for students and implement procedures to measure and access performance;

- Establish clear goals and improve the leadership needed to attain them; and
- Improve teacher preparation, performance, respect, and rewards (p. 5).

Lynch, Smith, and Rojewski (1994) conducted a qualitative theme analysis of 6 national and 12 state reports on education reform published from 1988 through 1993 that pertained directly to work force preparation. These reports focused primarily on high school vocational education. The six national reports included those sponsored by the Council of Chief State School Officers (1991), National Assessment of Vocational Education (Wirt et al. 1989), National Center on Education and the Economy (1989), Secretary's Commission on Achieving Necessary Skills (1991), Southern Regional Education Board (Bottoms, Presson, and Johnson 1992), and the William T. Grant Foundation Commission on Work, Family, and Citizenship (1988). After identifying major elements from each document, similar ideas were grouped together and classified by theme or issue that emerged. The resulting eight major themes and subthemes are presented in figure 4.

Lynch et al. (1994) concluded that reform of secondary vocational education was viewed as the joint responsibility of government, education, and business. All reforms called increasingly for a seamless education system that recognizes and credentials different routes to similar education and employment outcomes. The gap between resources and attention for college-bound and noncollege-bound students has to be closed. The integration of academic and vocational education combined with contextual learning were deemed major pedagogical reform strategies. World-class education standards and authentic assessment strategies were imperative for students. Also, integral to effective reform was the education and re-education of high quality teachers in both classrooms and workplaces. Teacher education needed to reform its curricula and pedagogy to conform to proposed education reform initiatives.

Similar to the previous findings and conclusions from various national and state reports, Boesel and McFarland (1994) in their report to Congress on reform in vocational education proposed new systems of work force preparation that will—

- encompass all noncollege-bound and some college-bound students;
- prepare students for careers rather than jobs;

THEMES

Guarantee Access to Postsecondary Education, Training, and Employment through Substantive Education Alliances
- Tech-prep programs
- Secondary/postsecondary institution linkages
- School and business/industry linkages

Allow for Meaningful Participation of All Youth Until Mastery
- Equal access and opportunities
- Early intervention programs for disadvantaged youth
- Flexible/alternative delivery systems
- Dropout prevention and recovery
- Significant support services and funding
- Aggressive outreach and recruitment

Provide Early Orientation to Work and Family Life
- Career exploration/development activities
- Middle school programs
- Improved career guidance and counseling
- Family life education

Integrate Theoretical and Practical Knowledge (Academic and Vocational; Rigorous)
- Curriculum redesign
- Focus on broad career clusters
- Explicit, challenging student outcomes
- Contextual-based instructional strategies
- Diverse, multi-approach to instruction

Employers, Employee Organizations, and Community and Social Services Must Share in Responsibility for the Development of Youth Employment Skills
- Business-education partnerships
- School-to-work transition programs—good jobs
- Apprenticeship and other on-the-job training models
- Community service
- Parent participation
- Social service assistance

Reform Student Assessment
- Model: diagnosis, assessment, program of study, evaluation
- Credentials or certificate of student mastery
- Credentials or certificate of occupational skills
- Alternative assessment techniques

Establish Policy Directives and Guidance
- Incentives to improve employment readiness
- World-class standards and assessment
- Coordination of education, health, training, and human services
- School restructuring
- Research, data on effectiveness and best practices, experimentation

Improve Teacher Training and Staff Development
- Enhance (or redesign) preservice teacher education
- Strengthen inservice teacher and staff development
- Resources/funding

Figure 4. Major themes and subthemes in reform of secondary vocational education

SOURCE: Adapted from Lynch, Smith, and Rojewski (1994), pp. 102-103.

- broaden the curriculum framework from occupations to industries or other more inclusive constructs;
- emphasize the development of cognitive skills, broad technical skills, and understanding of industries at the secondary level;
- emphasize the use of applications to teach underlying principles before teaching occupational procedures;
- use work experience, including jobs students find for themselves, to increase understandings of such issues as how the labor market functions and what skills and personal qualities the workplace requires;prepare most students for some form of postsecondary education and additional training;
- defer much, but not all, occupation-specific training to the postsecondary level;
- be competency based, be geared to external standards, be assessed by valid, reliable methods, and lead to portable certification; and
- allow for other essential courses, such as core academics (pp. 54-55).

In addition, Boesel and McFarland (1994) recommended that the general track in secondary schools be eliminated and that vocational education be folded into a broad career preparation system for the majority of students.

In this context of reform of vocational education, the report to the U. S. Congress also analyzed considerable information and data about vocational teacher education. Boesel and McFarland (1994) encouraged teacher education reform congruent with a reformed work force preparation system. They particularly encouraged teacher education to emphasize integrated learning and the development of cognitive skills, broad technical skills, and a broad understanding of industries. They recommended, as a minimum, a bachelor's degree with preservice training in education as a standard requirement for the certification of all new vocational teachers and occupational faculty. Such a program should include more rigorous courses in the liberal arts (especially math and science) and in computers.

Philosophy Revisited

The several reports that have delineated major workplace skills and competencies needed for the 21st century have linked them intimately with the development of basic educational skills. In summary, these skills seem to converge around the following categories (Hartley, Mantle-Bromley, and Cobb, 1996, p. 39):

- learning to learn
- reading, writing, and mathematics
- communications
- problem solving
- personal-career development
- interpersonal skills, including group development and team work
- organizational effectiveness
- technology
- science
- family/community/citizenship development

To develop workplace competencies and basic education skills, public school systems have been encouraged to integrate academic and vocational education, link school-based learning with work-based learning, modify pedagogy to reflect the current research from learning theory and the cognitive sciences, and infuse technology and real-world applications throughout the curriculum. Within this framework, it is suggested that vocational educators provide for career options that have long-range transferability instead of skills specific to only one job.

These changing workplace and related education requirements are suggesting a significant shift from Prosser's essentialist philosophy, which guided vocational education's development and growth for nearly 80 years. For the past 30 years, however, it appears as though the progressivism of Dewey should have had more of an impact on vocational education. This is especially true in the area of vocational education's relationship to society, work, and culture (Lerwick 1979). Other Deweyan influences that reflect society's relatively recent democratic expectations are equal opportunity, affirmative action, individualized education, bilingualism, multiculturalism, and human rights.

“These changing workplace and related education requirements are suggesting a significant shift from Prosser's essentialist philosophy, which guided vocational education's development and growth for nearly 80 years.”

Most modern controversy is not over whether progressivism is an appropriate theoretical framework for vocational education, but over failure to adjust vocational education's philosophy to more progressivist views and research in light of updates in societal expectations of schools, learning theory, and technology. Briefly, Dewey was against separate systems of vocational and general education. Recent movements toward applied academics and the integration of vocational and academic education reflect this viewpoint. Dewey's view of "man the problem solver" and education as the means of improving human problem solving is especially relevant in light of the recent reports that emphasize the need for workplace problem solving and

work-based learning. Progressivism also stresses flexibility in viewing the changing world and adaptability, both of which are emphasized in contemporary reports about learning and its relationship to the workplace. The progressivist philosophy stresses that vocational education should promote a more democratic and humane working environment, and the goals of vocational education should be to promote a knowledgeable citizenry, able to adapt to and accommodate technical and social change, who view work in relation to other civic aspects of life in a democracy (Lerwick 1979).

Based on inductive analyses of evolving and proposed practices in vocational and technical education, Miller (1996) concluded that the unifying contemporary philosophy for vocational education today—and thereby for vocational teacher education—is pragmatism and the corresponding theory of constructivism. To the pragmatist, the world is in process, and reality equates to experience in ordinary life. The learner changes just as the world changes. Furthermore, "the learner is a transitional being [and] each transitional event is the basis for a reconstruction of experience—the creation of meaning and a change in the individual" (Miller 1996, p. 60).

Emphasis in pragmatism is on change, learning by doing, and learning as a lifelong activity for students and teachers alike (Miller 1996). Schooling is part of democratic existence where it is viewed as a public duty and a means of socialization. For pragmatists, schools would provide opportunities for learners to develop capacities to become—

- *Problem solvers*. Learners would see problems as encouraging mental activity and creating opportunities that lead to the reconstruction of experience and creation of meaning. In this model, learners are self-directed and possess the ability to think critically and divergently about alternate solutions to workplace problems.
- *Collaborators*. Learners would be able to communicate and work constructively with others to solve problems and share in the making of meaning. Such learners become participants in team workplace decision making.
- *Makers of meaning*. Learners engage in systems thinking and reflective thinking and in constructing meaning of new experiences through relating past knowledge to present information.

- *Lifelong learners.* Individuals would understand the processes of learning and the need to be a learner for a lifetime. Learners would be aware of their personal learning style and the learning styles of others around them.
- *Change agents.* Learners would be agents for change who demonstrate flexibility and acceptance of the certainty of change. Such learners also demonstrate the ability to provide leadership as proactive change agents.
- *Practitioners in democratic processes.* Learners would be full participants in the democratic processes that guide collaborative activity. Diversity and emphasis on equality of all learners would be celebrated. (pp. 62-64)

Pragmatism parallels the contemporary educational theory and research identified with constructivism, which views the learner as one who constructs meaning from that which is learned. Constructivists see knowledge as gleaned through students' active, individual, and personal processes based on previously constructed knowledge. Qualitative and other evaluative methods are used to assess learning styles and to determine how individuals construct knowledge. Learning is manipulative and enactive. Emphasis is placed on multiple and equally legitimate perspectives and realities, but teachers and peers do interact with the learners to negotiate a passage toward socially accepted knowledge. Emphasis is on a community of practice. Constructivism draws on the socially situated nature of knowledge and individuals' existing cultural knowledge. It is recognized that humans' intellectual growth and development are formed through interactions with others as well as by their own individual processes (Steffe and Gale 1995).

According to Miller (1996), the pragmatist who draws on constructivism views reality as constantly changing. As teachers, pragmatists believe that each student has a set of unique experiences that he or she brings to the classroom. All students are experiencing, reconstructing experience, creating meaning, changing each day, and becoming. The role of teacher is to provide opportunities that will allow all students to build on previous experiences and make connections, not one of imparting knowledge to "blank slates" or passive learners. The teacher in this view is a facilitator rather than a dispenser of knowledge. Constructivists are moving away from government or prepackaged curricula into more integrated, experiential approaches.

Dewey's philosophy of progressivism, the changing nature of society and cultures surrounding it, changes in workplaces and

educational needs of the work force, and theory and research on teaching and learning have all had a cumulative effect on the contemporary philosophy and practices of vocational education and now on vocational teacher education. They have also created pressure for those responsible for vocational education and vocational education teachers to make some significant changes in programs and curricula. Increasingly, there is great concern for the social-human aspects of work as well as the technological dimensions. This represents a shift from mechanistic, technological, scientific, and one-way-only perspectives to much more democratic, individual and group problem solving, and experiential perspectives. In effect, all learners need to learn how to think for themselves and how to solve their own problems.

"As we head into the 21st century and research the changes institutions and workers are experiencing, it seems clear that the philosophical tenets associated with essentialism will no longer serve students and teachers well."

As we head into the 21st century and research the changes institutions and workers are experiencing, it seems clear that the philosophical tenets associated with essentialism will no longer serve students and teachers well. The remarkable insight of Dewey, the reality-based philosophy of pragmatism and its focus on readiness to change, and the evolving educational theory of constructivism seem far superior to underpin reforms in vocational education and the education of its teaching force. A comparison of several aspects of essentialism, progressivism, and constructivism is presented in Table 2.

Table 2
Comparison of Essentialism, Progressivism, and Constructivism

Comparison Area	Essentialism[a] (Prosser)	Progressivism[a] (Dewey)	Constructivism[b]
The essential role of vocational education is to:	Develop the pool of vocational and technical skills necessary for national security and to enable the nation to be competitive on the world market. Maintain a skilled labor force and educate society in skills needed for wise consumption of economic goods and services.	To teach people how to solve problems. Vocational education should promote a more democratic and humane working environment.	To facilitate construction of knowledge through experiential, contextual, and social methods in real-world environments.
End products of vocational education	A skilled, competent, and intelligent labor force. Stable society, firmly anchored in proven traditions and work force practices. Stable work force, well trained in foundational and specific skills. Vocational graduate will possess a trade or occupation that has economic worth.	Flexibility and open-mindedness toward alternate solutions. Knowledgeable citizenry who are vocationally adaptable and self-sufficient. Background in work education practiced in harmony with civic aspects of life in a democracy. Vocational graduates will possess a maximum number of career options at any given point in the learning experience.	Self-directed learners who make connections in workplaces and other environments based on personal and social experiences. Recognize the importance of goals for the learner, and reconcile the dichotomy between learner and teacher goals. Share and value the perspectives of others. There is no ONE reality or one right answer. Flexibility, adaptability, and problem solving.
The clientele and relation to community	People who want, need, and can benefit from vocational education and training should be given the opportunity to do so. Vocational education is closely related to the business, industrial, and economic aspects of the community. Its relationship to other social institutions, such as academic education, is less clearly defined.	People of all ages and abilities can benefit from vocational education. Everyone should be provided with opportunities to participate and experiment with vocational alternatives. Vocational education should be viewed as part of community life and should take place in the community itself.	Interdependence among individuals and the larger world around them. Learners always bring their own personal, social, cultural, work, and political histories, purposes, and interpretations with them to the situation, whether they are aware of it or acknowledge it or not. Learning occurs in social situations. Learning occurs best in the community where skills and knowledge will be practiced.

Table 2
Comparison of Essentialism, Progressivism, and Constructivism (Continued)

Comparison Area	Essentialism[a] (Prosser)	Progressivism[a] (Dewey)	Constructivism[b]
Curriculum	Curriculum contains the essential core of skills and knowledge required for employment. Courses should be built as an orderly sequence leading to successful and predetermined placement. Newly emerging jobs whose competency requirements are ambiguous ought to be avoided or approached on a risk management basis.	Curriculum should be two-fold focusing on short-range employability skills and long-term transferability skills. The transferability skills should accommodate changes in technology, society, and individual needs and aspirations.	The most important single factor influencing learning is what the learner already knows; build on prior knowledge. Integrated subject matter focusing on themes and how different content areas address that theme to assist students in making connections. Integration of academic and vocational education. Attention to metacognition and strategic self-regulation. Awareness of the importance of social context such as the difference between vocational (applied) math and formal math with an attempt to use the applied to teach the formal.
Teachers	Master of the occupational skill. Should be fact oriented with latest technical developments in their area of expertise.	Teachers must be able to identify student interests, arrange for development of innate abilities, and should facilitate learning through students' natural curiosity and motivation. Teachers should be versatile and act as guides in presenting meaningful problems to be solved.	The focus of teacher education is not just teachers' knowledge of the subject matter and pedagogy, but teachers' beliefs, conceptions, personal theories, experience related to subject matter, teaching, and learning. Teachers are facilitators of students who are building their own knowledge. The teacher is viewed as a coach who provides more direct instruction at first, which gradually fades as students become more proficient at problem solving. Teachers model, mediate, and scaffold. Teachers engage in diagnostic teaching and attempt to remedy learner errors and misconceptions.

Table 2
Comparison of Essentialism, Progressivism, and Constructivism (Continued)

Comparison Area	Essentialism[a] (Prosser)	Progressivism[a] (Dewey)	Constructivism[b]
Methods of teaching	Vocational learning should correspond to reality. Basic skills and technical knowledge are to be learned and applied exactly as they would be in a real employment situation. Lecture and demonstrations are particularly efficient. Teach single concepts and skills. Amenable to teaching machines.	A broad range of teaching and learning techniques should be used to teach basic vocational skills with the notion of expanded opportunities firmly in mind. Discussion and projects that develop problem-solving techniques and skills. Education for citizenship in a democracy. Teaching for making accommodations and adapting to change. Group interaction for team building.	Facilitate individual, personal learning. Learning is social, experiential, and active, thus emphasis on discussion, collaboration, negotiation, and shared meanings. The use of multiple representations of concepts.
Evaluation	The salability of acquired skills in the employment market.	Ability to compete in the job market. Ability to solve workplace problems. Ability to accommodate technical and social change.	Qualitative methods concentrating on learners' perceptions and constructions. Ability to adapt (assimilate and accommodate) and solve problems.

[a]Based on Lerwick (1979)
[b]Based on Steffe and Gale (1995)

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Teacher Education Reform

Teacher education generally has no shortage of reformers. Educational researchers, teachers' associations or unions, college faculty from the liberal arts, state education governing boards, legislators, journalists, and indeed the general public have had much to say about their expectations for teachers and teachers' education in the past 12 or so years. One group, for example, demands that teacher education be provided only at the graduate level after first receiving a bachelor's degree in the liberal arts. Another wants most teacher education delivered on site, via something called professional development or laboratory schools, usually with much more clinical involvement with schools and children earlier in students' college programs. A third wants teachers to demonstrate mastery of a common core of professional knowledge and pedagogical skills prior to licensure. Most of these reports have focused primarily on the education of elementary and middle school teachers and those teaching in traditional high school subject areas (e.g., math, science, language arts, social studies, foreign languages, and the arts).

Until very recently, vocational teacher education did not participate in any meaningful way in the reform of teacher education. It was often considered an exception at the table of reform or was not even invited to the table to participate. Cumulative evidence showed that vocational teacher education had not changed much in relation to major themes or tenets of teacher education reform initiatives. (See, for example, Hartley, Mantle-Bromley, and Cobb 1996, Lynch forthcoming-b; Lynch and Griggs 1989; and Pratzner 1987). Of course, what had happened is that most vocational teacher education programs had experienced steep enrollment declines and many programs in the nation's colleges and universities had been closed (Lynch 1996a). However, in 1992, the University Council on Vocational Education and the National Association of State Directors of Vocational Education began a serious effort to propel action toward meaningful reform in vocational teacher education. A few studies, a national conference and a resulting report, several papers, and a book resulted from the work of various participants in these reform endeavors.

This section of the monograph examines the salient features of teacher education reform generally and then specifically for vocational teacher education.

Reform in Teacher Education Generally

Most of the current reform efforts emanated after ***A Nation at Risk***, the now infamous report of the National Commission on Excellence in Education (1983), was published. ***Nation*** captured the attention of the public and the states' legislative bodies with its devastating analysis of public education and its well-known quote about schools: "the rising tide of mediocrity." Less publicized, but instrumental in initiating reforms in teacher education, was this report's recommendations for improving teacher preparation and teaching as a profession.

Nation at Risk spawned several other reports, studies, gathering of databases, and analytical pieces about teacher education and some experimentation that collectively (may) have the potential to change significantly both the subject matter of teacher education and the processes by which it is delivered. It may have also provided impetus for over 1,000 pieces of legislation, since most states mandated changes in the 1980s in such areas as teacher testing, admissions into teacher education, state certification, and curriculum (Darling-Hammond and Barry 1988). Summarizing a "sea of change" in a 10-year period, Imig and Switzer (1996) delineated "profound" changes in teacher education—generalized to the nearly 1,300 colleges and universities that offer teacher education—as follows:

- Admission standards were raised and exit requirements were increased;
- Enrollments gradually increased even while budget allocations were flat (or declined);
- Faculty scholarship expectations increased and new forms of inquiry, including ethnographic and other qualitative forms of research, were developed;
- In many places, curricula were recast to give greater emphasis to multiculturalism and the creation of a culturally responsive pedagogy, often leading to the recruitment of minorities for faculty and teacher candidate positions;
- The attention to pedagogy and "good teaching" increased and faculty took seriously the demands for more "relevant" but high quality content;

- More of the programs for teacher education were pushed into public schools and into other learning environments using practitioners as "clinical faculty";
- Faculties struggled to create "communities of scholars" often including K-12 practitioners, that sought to identify a common mission and a strong commitment to a single conception of the "good teacher";
- Teacher candidates changed (as they became older, part time, more serious, and often burdened with their own parenting and work responsibilities);
- Cohort groups emerged, instructional laboratories were built on campuses (better to videotape and analyze teaching performances), and professional development or partner schools or other forms of clinical practice were explored;
- Foundation courses and fundamentally reshaped tests and measurements expectations called attention to new knowledge about assessment and cognitive psychology; and
- The call for school reform intensified, and all educators studied the emerging K-12 content standards to enable faculty to reshape their methods courses and the overall "framework" of their programs (p. 214).

Besides these general changes that occurred in teacher education programs nationwide, Imig and Switzer (1996) also discussed the tremendous potential and impact on teacher education from technology use and infusion, research on knowledge bases, simultaneous renewal of teacher education in conjunction with restructuring of public education, and more focus on comprehensive and integrated services for children and youth. They also commented that a persistent and unresolved problem in teacher education is how to achieve greater diversity within the teaching force.

In addition to the accomplishments cited by Imig and Switzer, there are many groups or coalitions that have launched very ambitious agendas to reform teacher education. These groups are committed to very real, meaningful—sometimes radical—changes in teacher education or in teaching (and by obvious relationship, teacher education). Some of these groups have corporate or government funding. Others are coalitions or consortia that have pooled resources to achieve mutual goals. In Table 3, a brief summary of the major groups and appropriate references are provided.

In addition to the major groups identified in Table 3, many professional associations, teachers' groups, public school-based consortia (e.g., Ted Sizer's Coalition of Essential Schools), and

Table 3
Summary of Major Reform Initiatives of Relevance to Teacher Education

CARNEGIE FORUM ON EDUCATION AND THE ECONOMY	The Carnegie Forum (1986) is well known for its policy analysis report, ***A Nation Prepared: Teachers for the 21st Century,*** which was in response to ***A Nation at Risk.*** This report included eight specific recommendations designed to advance the profession of teaching and to improve the academic preparation of teachers. The Carnegie Corporation has invested heavily to implement several of its recommendations, including funding for the National Board for Professional Teaching Standards. It most recently has provided funding to local school systems to support significant professional development for inservice teachers. The Carnegie Corporation, located in Rochester, NY, is the parent for the National Center on Education and the Economy. Of particular relevance to vocational educators is the National Center's (1990) often-cited report, ***America's Choice: High Skills or Low Wages!***
THE HOLMES GROUP	Membership was originally composed of about 100 large, research universities who support colleges of education to transform public schools into professional development schools that act as laboratories where future teachers are trained. Holmes focuses on graduate-level training for teachers, building on a bachelor's degree in liberal arts. Typically, a fifth or sixth year of focused study in education culminates in a master's degree in education. Other major foci include more applied research on teaching and learning, modeling of good practices in schools, and rigorous teacher preparation. Holmes has published three major reports highlighting its foci and agenda: **Tomorrow's Teachers** (1986), **Tomorrow's Schools** (1990), and **Tomorrow's Schools of Education** (1995). In 1996, members of the "former Holmes Group" voted to revise its bylaws to create a "new organization" to include institutions of higher education in partnerships with schools (called local partnerships) and professional organizations (called partners). The "new" Holmes Partnership has established six goals: (1) high quality professional preparation; (2) simultaneous renewal of public K-12 schools and educator preparation; (3) equity, diversity, and cultural competence; (4) scholarly inquiry and programs of research; (5) faculty development; and (6) policy analysis, development, and initiation related to public K-12 schools and the preparation of educators. Holmes was founded in 1987. It is headquartered at Michigan State University. The interim chair for the Holmes Group Board of Directors is Nancy L. Zimpher, Dean of the College of Education at Ohio State University and interim president of the Holmes Partnership is Frank Murray, former Dean of Education at the University of Delaware.

Table 3
Summary of Major Reform Initiatives of Relevance to Teacher Education (Continued)

INTERSTATE NEW TEACHER ASSESSMENT AND SUPPORT CONSORTIUM	This program articulates standards for a common core of teaching knowledge and skills to be acquired by all new teachers (See figure 5.) INTASC was established to enhance collaboration among states interested in rethinking teacher assessment for initial licensing as well as for preparation and induction into the profession. Mastery of the "common core" (standards related to student learning and development, curriculum and teaching, contexts and purposes, and professional understandings, abilities, and commitments) is analogous to the first tier of assessment for licensing in other professions. INTASC and its standards development have been drafted by personnel from 17 state agencies and representatives of various professional education associations. It is a program of the Council of Chief State School Officers and is located in Washington, DC. M. Jean Miller is the Director of INTASC at CCSSO and Linda Darling-Hammond, Professor at Teachers College, Columbia University, is chair of the Standards Task Force.
NATIONAL BOARD FOR PROFESSIONAL TEACHING STANDARDS	Committed to basic reform in U.S. education especially in teaching and learning, NBPTS has embarked on a three-part mission: (1) to establish high and rigorous standards for what accomplished teachers should know and be able to do; (2) to develop and operate a national voluntary system to assess and certify teachers who meet these standards; and (3) to advance related education reforms for the purpose of improving student learning in U.S. schools. NBPTS plans eventually to set standards and award certificates to highly effective teachers in more than 30 fields, including vocational education, as defined by the development level of the students and the subject or subjects being taught. NBPTS is a nonprofit, nonpartisan organization governed by a 63-member board of directors, the majority of whom are teachers. Current board chair is James B. Hunt, Governor of North Carolina. The President is James B. Kelly. NBPTS has offices in Washington, DC, and Southfield, MI.
NATIONAL COMMISSION ON TEACHING AND AMERICA'S FUTURE	This is not an experimental or implementation group or coalition. Rather, it is a research and advocacy group of 26 public officials, business and community leaders, and educators who are broadly knowledgeable about education, school reform, and teaching. Among its goals are to develop a comprehensive blueprint for recruiting, preparing, and supporting a teaching force that can meet 21st-century standards of high educational performance and to develop a policy agenda that connects current initiatives in the profession, including reforms in teacher education, licensing, certification, and accreditation with local, state, and federal policy initiatives for school improvement and restructuring. The commission issued recently (September 1996) its widely discussed report, ***What Matters Most: Teaching for America's Future***, which included among its five recommendations strong calls to reinvent teacher preparation and professional development and to "fix" teacher recruitment and put qualified teachers in every classroom. The commission is chaired by Governor James B. Hunt, Jr., of North Carolina and directed by Linda Darling-Hammond, professor at Teachers College, Columbia University. It was formed in 1994 and has been funded by the Rockefeller Foundation and Carnegie Corporation of New York.

Table 3
Summary of Major Reform Initiatives of
Relevance to Teacher Education (Continued)

NATIONAL COUNCIL FOR ACCREDITATION OF TEACHER EDUCATION	About one-half of the nation's college and university teacher education programs are accredited by NCATE. The various standards contain explicit expectations for institutions that prepare teachers. Standards address four categories: curriculum of professional education, candidates in professional education, professional education faculty, and the unit for professional education (i.e., governance structure and resource availability). Within each category are several standards that must be met and related criteria for compliance. NCATE is administered in Washington, DC; its chief executive officer is Arthur Wise. Units are reviewed by a board of examiners team who weigh evidence and data for each indicator.
NATIONAL NETWORK FOR EDUCATION RENEWAL	The 23 network universities call for revamping teacher education simultaneously with restructuring public schools. Salient goals call for creation of "centers of pedagogy" that are dedicated to creating highly effective teachers, have their own budgets, and have the same autonomy and prestige as law and medical schools. Centers work simultaneously with public schools who are committed to improving teaching and student learning. The network's goals and its centers' agenda are based on 19 postulates or objectives as outlined in its founder's text, ***Teachers for Our Nation's Schools*** (Goodlad 1990). John Goodlad is Director of the network at the University of Washington.
THE PROJECT 30 ALLIANCE	Includes 42 colleges/universities that advocate incorporating more liberal arts courses into teacher education. Members wish to ensure that teachers have a more thorough knowledge of the disciplines they teach. The group was organized in 1988 with a grant from the Carnegie Corporation of New York. It was founded by Frank B. Murray, then Dean of the College of Education at the University of Delaware, and Daniel Fallow who is currently provost at the University of Maryland at College Park. Its current president is Thomas J. Lasley at the University of Dayton.
THE RENAISSANCE GROUP	Eighteen members believe that teacher education programs must have the full support of the universities' leadership. The group requires full participation of the university president as the main criterion for membership. The group advocates 11 other principles, among them that clinical education experiences must be infused throughout the college years and begin prior to the student's senior year in college. The group began in 1989 with membership from five state universities with a strong tradition and reputation in teacher education: University of Alabama at Birmingham, University of Northern Iowa, University of Northern Colorado, Western Kentucky University, and California State University at San Bernardino.

legislated state entities or political groups have as a part of a program of work activities related to teacher education. For example, the National Education Association and the American Federation of Teachers both have supported a range of efforts to ground teacher education in a solid professional knowledge base and to forge school and college partnerships. The National Council for the Teaching of Mathematics and the National Council of Teachers of English have both been actively involved in translating subject-matter content standards into frameworks or standards for teacher education. The federal Office of Educational Research and Improvement, the National Governors Association, the Education Commission of States, and several other policy-oriented research or influencing groups have commissioned papers, sponsored conferences, or heard testimony about teacher education.

Of particular note is the work of the Interstate New Teacher Assessment and Support Consortium (INTASC 1992). In 1987, the Council of Chief State School Officers established INTASC to enhance collaboration among states interested in rethinking teacher assessment for initial licensing as well as for preparation and induction of teachers into the profession. Initially, 17 states and several professional associations comprised INTASC; an additional 22 states are now participating in subsequent development work.

In its initial work, INTASC has drafted 10 model standards—tentatively labeled principles—for licensing **beginning** teachers (figure 5). The standards—the composite of which comprise a common core of professional education knowledge for beginning teachers—are intended to include the common principles, foundations of teacher practice, and common core of teaching knowledge and skills that cut across specialty areas. The standards embody the kinds of knowledge, skills, and dispositions that it is believed teachers need to practice responsibly as they enter teaching and that will provide them with the foundation for eventual success as highly effective teachers. INTASC believes that "the complex art of teaching requires performance-based standards and assessment strategies that are capable of capturing teachers' reasoned judgment and that evaluate what [beginning teachers] can actually do in authentic teaching situations" (p. 3).

Development of these draft standards by INTASC has been coordinated with the mission and major propositions that guide the National Board for Professional Teaching Standards, an organization committed to certifying highly accomplished **experienced** teachers. Both INTASC and NBPTS have included representation on their task forces and in deliberations from a wide range of educators (especially from teachers), as well as researchers; state agency personnel, local school

BEGINNING TEACHER STANDARDS	
Principle #1:	The teacher understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches and can create learning experiences that make these aspects of subject matter meaningful for students.
Principle #2:	The teacher understands how children learn and develop and can provide learning opportunities that support their intellectual, social, and personal development.
Principle #3:	The teacher understands how students differ in their approaches to learning and creates instructional opportunities that are adapted to diverse learners.
Principle #4:	The teacher understands and uses a variety of instructional strategies to encourage students' development of critical thinking, problem-solving, and performance skills.
Principle #5:	The teacher uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.
Principle #6:	The teacher uses knowledge of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom.
Principle #7:	The teacher plans instruction based upon knowledge of subject matter, students, the community, and curriculum goals.
Principle #8:	The teacher understands and uses formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social, and physical development of the learner.
Principle #9:	The teacher is a reflective practitioner who continually evaluates the effects of his/her choices and actions on others (students, parents, and other professionals in the learning community) and who actively seeks out opportunities to grow professionally.
Principle #10:	The teacher fosters relationships with school colleagues, parents, and agencies in the larger community to support students' learning and well-being.

Figure 5. Draft standards for beginning teacher licensing

SOURCE: Interstate New Teacher Assessment and Support Consortium (1992)

administrators, and teacher educators; and community representatives. It is expected that the work of both of these groups will serve as primary sources in the redesign of teacher education, both for initial preparation and advanced studies.

Despite the increased attention and focus on teacher education, nearly all observers agree that much needs to be done. Change has been increasingly difficult and the paths to change have been fraught with persistent problems. Imig and Switzer (1996) point out that teacher education remains chronically underfunded on most college and university campuses. They also note that clinical, field-based programs are terribly expensive and require differentiated staffing to be successful. Few universities have been willing to commit the resources or to institutionalize school-university partnerships and related staffing changes. More positively, Imig and Switzer did note that many colleges have been successful in transforming nearly every aspect of the teacher education program and are enjoying great success in educating a new generation of teachers.

Reform in Vocational Teacher Education

Vocational educators appear to have begun to take seriously reform of teacher education around 1993. Until then, it appears as though very few institutions with vocational teacher education engaged in much dialogue about reform or showed much concern that their graduates perhaps were not meeting the public's expectations for teacher preparation.

There were some documents published in the late 1980s that analyzed various teacher education reform initiatives (for example, implications from the Holmes Group on vocational teacher education), provided authors' suggestions for a vocational education response to these reform initiatives, or pointed out why such initiatives might be troublesome to the vocational education establishment. (See, for example, Adams, Pratzner, Anderson, and Zimmerer 1987; ***Beyond the Debate: Perspectives on the Preparation of Vocational Education Teachers*** 1988; Griggs, Jones, and Slocum 1988; Lynch and Griggs 1989). However, as pointed out by Lynch (1991), "macro, significant changes have not been made" (p. 198). His assessment was based on data collected in 1989 from 78 colleges and universities that purported to offer four or more vocational teacher education programs (n=98). The study was done to overcome the lack of knowledge about where, when, what, how, to whom,

and by whom vocational teacher education is provided. In this descriptive study, data showed the following:

- A relatively small number of U.S. colleges and universities were committed to preparing teachers for vocational education programs.
- Universities were closing or downsizing vocational teacher education programs.
- Student enrollments were declining in most vocational teacher education programs (steep declines in agricultural and home economics education).
- The professorate was relatively aging.
- The greatest changes being implemented in vocational teacher education programs were in response to state legislated or mandated reforms, such as to increase entrance and exit grade point requirements, teacher testing, and the time devoted to field-based experiences.

In general, Lynch verified that which had been suspected for a number of years: Vocational teacher education in the nation's colleges and universities was deteriorating and not responding meaningfully to general teacher education reform initiatives.

There have been many reasons provided for the apparent deterioration of vocational teacher education. As reported by Dykman (1993) in the journal of the American Vocational Association, downsizing and elimination occurred for the following reasons:

- Low enrollment—students are simply choosing not to major in a vocational teacher education subject area;
- Elimination of specific federal funding for vocational teacher education;
- Declining secondary vocational enrollments and thus no perceived need for vocational teachers;
- A sluggish national economy and related university budget cuts;
- Misunderstanding of vocational teacher preparation by deans of colleges of education;
- Infighting among vocational education disciplines;
- Less support from state agencies because of budget cuts;
- Removal of certification requirements for postsecondary vocational instructors;
- An unfairly tarnished image of vocational education; and
- Low teaching salaries that turn off potential students (p. 24).

With the alarm sounded now in both the research and association literature, the University Council for Vocational Education and the National Association of State Directors of Vocational Technical Education Consortium began to address reform. A joint task force of the two groups published its report in April 1995. This task force proposed two major areas of action, summarized in figure 6.

Essentially the report called for a new vision of vocational teacher education, not just marginal levels of improvement. The report used new terms, "learning enterprise" and "learning enterprise workers." The report emphasized that learning will take place in a variety of educational environments or "learning enterprises": K-12, postsecondary institutions, workplaces, families, and communities. Within these environments, there will be many "enterprise workers": teachers, counselors, administrators, apprenticeship coordinators, technicians, curriculum directors, support staff, etc. The Task Force called for greatly improved leadership for reform of learning enterprises and in the preparation of learning enterprise workers. The report recommended expanded collaborative efforts among all levels of stakeholders, including business and industry and college/university deans and provosts. Critical, too, was the call for use of research and development and exemplary practices to undergird innovative new models to prepare learning enterprise workers.

The University Council for Vocational Education (UCVE) also began extensive study and analysis of vocational teacher education. Its 3-year work included a focused task force on teacher education, review of the teacher education reform literature, drafts of position papers, electronic mail discussions, meetings at professional conferences, sponsorship of a national "summit" conference, and publication of a text, ***Beyond Tradition: Preparing the Teachers of Tomorrow's Workforce*** (Hartley and Wentling 1996).

In October 1995, UCVE in cooperation with the National Center for Research in Vocational Education and the U. S. Department of Education sponsored a national summit in San Diego. Nearly 100 educators wrestled with the reform of vocational teacher education. From the conference speakers and research community came several themes to undergird reform. As presented in figure 7, major points include a broader vision for vocational teacher education, greatly increased collaboration in teacher preparation, development and use of standards and authentic assessments, diversity within the teaching force, and

Action Area I: Bridging Mechanisms

Develop a state-by-state "commission on professional development" to develop and promote actions focused on the qualitative improvement of the professional development of learning enterprise workers.

Action Area II: Thirteen Places to Start

A. Develop shared meaning for key concepts and outcomes.

1. Develop a new language for addressing competencies needed for the profession.
2. Analyze and synthesize licensing, certification, and credentialing across states.

B. Design and develop a customer-driven learning system.

3. Conduct supply and demand studies for learning enterprise workers.
4. Identify new and emerging areas of expertise needed in learning enterprises of the future.
5. Attract high quality learning enterprise workers for new and emerging roles.
6. Respond to equity and diversity needs and expectations in the design and operation of preparation programs for learning enterprise workers.
7. Encourage multiple pathways for preparation of learning enterprise workers, while at the same time recognizing the increased expectation for the professional competence of these workers.
8. Model needed change in learning enterprises in the preparation programs for learning enterprise workers (e.g., integration of academic and vocational programs, use of work-based learning, and the need for lifelong learning.)

C. Design and develop an accountability system.

9. Develop the equivalent of entry-level industry standards for the profession.
10. Develop measures that tie the funding for preparation of learning enterprise workers to performance.

D. Implement the customer-driven learning system and accountability system.

11. Develop compacts or barter systems for learner resources and learner support among learning enterprises, business and industry, sole state agencies, and the government.
12. Develop a network for key stakeholders to improve communication.
13. Transform current learning enterprises at all levels.

Figure 6. Vocational teacher education: Areas of action

SOURCE: *Task Force on Vocational Technical Teacher Education Final Report* (1995)

Vocational education must take hold of a broader vision and develop a shared language in the larger context of reform.

There is a continued and deepening call for integration of vocational and academic education. Vocational teacher education can no longer live in isolation, but must act collaboratively.

A growing scarcity of resources accompanies a reduction in vocational teacher education programs across the country. Collaborative efforts across states, regions, and specializations in vocational teacher education are essential to compensate for declining funds and declining mass.

Vocational teacher education should link the contexts of work, family, and community, developing educational partnerships with business and industry, community agencies, and families.

Teacher education programs as a whole need to develop close ties to those they serve directly, particularly the K-12 schools. Colleges of education should become the learners rather than the teachers.

Vocational teacher education needs to develop standards and authentic assessments for evaluation of educators and programs.

Increasingly, standards are driving reform in education, causing teacher education to become an increasingly politicized arena. Accreditation issues offer opportunities to review programs and garner outside interest and support from stakeholders.

As demographics continue to change, the diversity in populations of students contrasts sharply with a lack of diversity in the teachers who serve them.

There is a growing need for exemplary educators who are prepared to cope with the complexities of change.

There is an increasing need for vocational educators to partner with communities, business, and industry toward more authentic preparation of the work force. Business and industry needs highly skilled workers.

There is a need for development of knowledge bases for vocational education which take into consideration new breakthroughs in cognitive science and the need for students to learn in authentic, real-world contexts.

Figure 7. Themes for action in vocational teacher education

SOURCE: Holder and Pearson (1995), p. 2.

Teacher Education Reform

Define who we are.
- Develop a new vision/mission statement for vocational education
- Redefine vocational education
- Develop new language consistent with reform in vocational and academic teacher education
- Idenfity our clientele

Increase communication/build a sense of community.
- Develop a national network via electronic mail
- Encourage/build participation in a national network of teacher educators
- Develop materials specifically for use on the Internet

Build partnerships.
- Identify/prioritize key stakeholders in vocational teacher education
- Identify/implement existing partnership models/processes that work
- Fund development of models for collaborative partnerships among various stakeholder groups
- Open membership of professional organizations (UCVE) to include others, i.e. deans, administrators, students, business and industry representatives

Promote professional development and lifelong learning.
- Implement "commissions on professional development" on national, regional, and/or state levels
- Develop models of lifelong learning for all levels of learners/educators
- Plan and promote *regular* meetings/conferences for the professional development of teacher educators
- Provide leadership training and opportunities among the ranks--mentor graduate students in leadership

Develop a common knowledge base for vocational teacher education.
- Identify/select existing theories on which to base reform of vocational teacher education
- Strive for unification of/agreement on a common knowledge base for (vocational) teacher education
- Support the development of new and alternative theories for (vocational) teacher education

Develop model programs for teacher education.
- Identify the skills, knowledge, and abilities needed by (vocational) educators of the future
- Identify/locate exemplary programs for teacher preparation
- Fund and develop collaborative models for the integration of academic and vocational teacher preparation
- Implement processes for "sharing" efforts and information on development of model programs

Develop standards for the profession.
- Adopt a set of standards for (vocational) teacher education
- Collaborate with licensing and accrediting agencies in the development of standards and assessments
- Develop a feedback process for review of existing and future standards and assessments

Develop exemplary educators.
- Develop recruitment strategies and processes that attract exemplary educators at all levels
- Develop recruitment strategies that address issues of diversity
- Address the declining critical mass of educators and students in vocational education

Figure 8. Action agenda for vocational teacher education

SOURCE: Holder and Pearson (1995), p. 2

development and use of authentic knowledge bases that should include research from the cognitive sciences and situated cognition. A summary of the aims and actions produced by the participants is presented in figure 8.

In 1996, UCVE published a refereed text devoted exclusively to reform of vocational teacher education. Eight chapters written by different authors focused on critical elements thought to inform practitioners (e.g., college deans, professors, state agency teacher certification and staff development personnel, and local administrators responsible for vocational education programs of the future) about needed reforms. In summing up the views of the various authors and the 3-year work of UCVE, Bromley, Cobb, and Hartley (1996) stated:

> The writers of this monograph agree that substantive change in vocational education and the preparation of its teachers is both necessary and inevitable. Furthermore, they note that such change cannot be simple, involving merely different responses to different events. It must be systemic, profound change—a difference in the way the preparation of the world of work is conceptually organized. If vocational education and its teacher educators do not fully embrace such fundamental changes, the field of vocational and technical education may not survive in any form. (p. 167)

Excellence in Preparing Vocational Education Teachers

What must teachers know about teaching? About learning? About subject matter? What is the subject matter of vocational education? What must teachers know about students—both generally and as individuals? What knowledge is essential to their work?

How is such knowledge generated and confirmed? Where does the knowledge come from in vocational and technical education? Who produces it? How different is knowledge needed by vocational teachers from that needed by general education teachers? Is teaching (and teacher education) really based mostly on opinion, intuition, and experience? Or, is there really a researchable knowledge base?

What is known about effective teaching? Effective teaching in vocational and technical education? What is known about highly effective vocational education teachers?

Is most of the knowledge about teaching and learning (and even teacher education) already known? Is it adequate for 21st-century workplaces and schools? If not, what needs to be added?

How does knowledge translate into practice in education, especially in teacher education? What do highly effective teacher educators need to know and be able to do to develop highly effective teachers?

These questions and many others often confuse and frustrate teacher educators and designers of teacher education programs. Substantive questions about the knowledge bases underlying teaching, learning, and teacher education often go unanswered. Authors have recently bemoaned the lack of an empirical knowledge base to undergird vocational teacher education. Knowledge-base discussions sometimes relate to philosophy. What is the philosophical basis for *contemporary* vocational teacher education? Some discussions relate to epistemology. What is (are) the source(s) of knowledge to be used to design vocational teacher education (i.e., work-based teacher education)? Some

question the wisdom of continuing to organize subject matter by traditional vocational education program areas, such as agricultural education, business education, trade and industrial education, and so on. (See, for example, chapters in Hartley and Wentling 1996.)

To complicate the redesign of vocational teacher education further is the apparent lack of professionally agreed-upon information about vocational teaching and teacher education that has resulted from attempts to test hypotheses and answer questions. Such substantive knowledge "is gained from studies of teaching that use conventional scientific methods, quantitative and qualitative; these methods and their accompanying designs are intended to yield a commonly accepted degree of significance, validity, generalizability, and intersubjectivity" (Fenstermacher 1994, p. 8). Further, there sometimes appears to be a genuine naivete among college faculty, teachers themselves, vocational directors and supervisors, and certainly the public about knowledge bases or studies—and their validity—needed by students who are preparing to enter vocational education teaching.

However, and for all of the deficiencies in U.S. education and teacher education—and vocational and vocational teacher education—it must be affirmed that an incredible amount of knowledge has been learned in the last few decades about human cognition, cognitive processing, readiness to learn, giftedness, various forms of retardation, assessment, student diagnosis, teacher expectancy, motivation, classroom management, authentic pedagogy, excellent teachers, school leadership, and on and on. Indeed, many groups and researchers in education have been proceeding on many fronts to identify knowledge bases to undergird the redesign of teacher education. As noted by Christensen (1996), whether such efforts "are having any effect on teacher education programs, however, is another matter" (p. 38).

Related to vocational and technical teacher education, the knowledge bases seem to be evolving. They have yet to be codified or debated (Lynch 1996a). It is anticipated that considerable work will be forthcoming as researchers and program developers begin to redesign vocational teacher education programs and test the validity and impact of newly postulated knowledge bases.

This section of the monograph focuses on effective teaching in vocational and technical education and has been prepared to help inform vocational education in the redesign of its teacher education programs. Some discussion is provided about

vocational teaching from empirical research. The in-process work of the National Board for Professional Teaching Standards (NBPTS) and its initial draft standards for vocational education are reviewed. Then, drawing on the work of NBPTS and other reform initiatives, 10 principles of vocational teacher education are presented.

Empirical Research about Effective Teaching in Vocational Education

There does not appear to be a critical mass of empirically based knowledge about effective teaching in vocational education. There were no studies found in the literature about postsecondary teaching that used a design to include classroom or work-based learning observations and experimentation and that included related empirical methods.

“There does not appear to be a critical mass of empirically based knowledge about effective teaching in vocational education.”

At the secondary level, perhaps the most significant work was done in the 1980s by Weber, Puleo, Fisch, Kurth, and Schaffner (1988). Interesting, though, is that this work was not directed at effective teaching in high school vocational education classes; rather, it compared selected instructional practices used by vocational teachers with those used by nonvocational teachers. Nevertheless, the work of Weber and his colleagues is informative to understand teaching in vocational education classrooms.

Weber et al. observed 893 classrooms in 120 schools in 24 states and collected data on a questionnaire from 2,251 teachers. Observations were to determine "*who* is doing *what* to *whom* and *how* at a given moment" (p. 27). Questionnaires were used to determine the relative emphasis teachers placed upon various activities and outcomes in their teaching and related roles. Weber et al. (1988) found the following:

- In vocational classrooms, the teacher is not the "leader" of instruction as often as in nonvocational classrooms and more frequently the students are working individually;
- In vocational classrooms, students are more likely to be observed practicing some behavior or skill than they are in nonvocational classes; students in vocational classrooms are less likely to be observed being presented information;

- Related, in vocational classrooms, students are more likely to be organized and working individually and in small groups than they are in nonvocational classes; they are less likely to be observed working in large groups or total class configurations;
- Basic skills were taught more in nonvocational classes;
- The pattern of interactions in vocational classrooms is more likely to be student-to-student and less likely to be teacher-to-student; the reverse is true in nonvocational classrooms;
- Vocational teachers are less likely than nonvocational teachers to use audiovisual presentations, lectures, chalkboards, class discussions, written work, reading, and testing than nonvocational teachers; the converse is true with such methods as demonstrations, simulations, and hands-on practice with machines, tools, and other instructional aids; and
- In vocational classrooms, performance assessments are more likely to be used when conducting evaluations than in nonvocational classes where the use of paper-pencil tests is more prevalent (pp. 29-30).

With relevance to studies on effective teaching, themes from two qualitative studies indicate that award-winning high school agriculture and marketing teachers (i.e., state teachers of the year) have similar qualities (Hedges and Papritan 1987; Ruff 1989). Both studies reported that outstanding teachers were technically up to date, self-motivated and self-directed, reflective, changed their practice based on feedback, were very positive with students and others and assumed additional professional roles (e.g., counselor, parent) with them, and were committed to students and their success. Further, award-winning vocational teachers—

- worked to motivate and build the self-image of students,
- were interested and concerned about all students,
- received much of their own satisfaction from students' successes and achievements,
- set clearly defined and reachable goals and directions for students,
- helped students to self-evaluate,
- held positive attitudes about students,
- used community resources and individuals in business and industry in a variety of capacities to evaluate and improve the program and performance of students, and
- had a high quality supervised occupational experience program for each student.

National Board for Professional Teaching Standards

The NBPTS has established a long-term, ambitious agenda to accomplish a three-part mission: (1) to establish high and rigorous standards for what accomplished teachers should know and be able to do, (2) to develop and operate a national voluntary system to assess and certify teachers who meet these standards, and (3) to advance related education reforms for the purpose of improving student learning in U.S. schools.

The board, its staff, its many committees, and countless constituents are committed to delineating outstanding teaching practices and developing them into standards that highly accomplished teachers are expected to employ in their daily practices of helping students to learn. The standards for each subject area (including vocational education) represent a "professional consensus on the critical aspects of practice that distinguish exemplary teachers in this field from novice or journeymen teachers" (NBPTS 1996, p. 1).

Thus, it is important to note from the outset that the agenda addresses standards for *highly accomplished* vocational education teachers. Such teachers are evaluated to be among the best the profession has to offer, based on assessments of what it is teachers know and are able to do to ensure that their students are learning. Teachers must have at least 3 years of classroom experience before they are eligible for national assessment and certification. Obviously, beginning teachers are not expected to be able to demonstrate mastery of the standards. However, the philosophical and research contexts for NBPTS and the related standards for vocational education are appropriate for reform of vocational and technical teacher education programs. The standards can constitute a major basis for program and curriculum redesign.

Undergirding NBPTS' standards for all subject areas, including vocational education, are five core propositions that form the philosophical context for standards development. These propositions are drawn heavily from constructivism and progressivism and are based on cumulative research on teaching and learning processes. The five core propositions and related discussion about each are presented in Exhibit 1.

Exhibit 1
What Teachers Should Know and Be Able to Do: Core Propositions from the National Board for Professional Teaching Standards

(1) Teachers are committed to students and their learning.

National Board Certified Teachers are dedicated to making knowledge accessible to all students. They act on the belief that all students can learn. They treat students equitably, recognizing the individual differences that distinguish their students one from the other and taking account of these differences in their practice. They adjust their practice, as appropriate, based on observation and knowledge of their students' interests, abilities, skills, knowledge, family circumstances, and peer relationships.

Accomplished teachers understand how students develop and learn. They incorporate the prevailing theories of cognition and intelligence in their practice. They are aware of the influence of context and culture on behavior. They develop students' cognitive capacity and their respect for learning. Equally important, they foster students' self-esteem, motivation, character, civic responsibility, and their respect for individual, cultural, religious and racial differences.

(2) Teachers know the subjects they teach and how to teach those subjects to students.

National Board Certified Teachers have a rich understanding of the subject(s) they teach and appreciate how knowledge in their subject is created, organized, linked to other disciplines and applied to real-world settings. While faithfully representing the collective wisdom of our culture and upholding the value of disciplinary knowledge, they also develop the critical and analytical capacities of their students.

Accomplished teachers command specialized knowledge of how to convey and reveal subject matter to students. They are aware of the preconceptions and background knowledge that students typically bring to each subject and of strategies and instructional materials that can be of assistance. They understand where difficulties are likely to arise and modify their practice accordingly. Their instructional repertoire allows them to create multiple paths to the subjects they teach, and they are adept at teaching students how to pose and solve their own problems.

(3) Teachers are responsible for managing and monitoring student learning.

National Board Certified Teachers create, enrich, maintain, and alter instructional settings to capture and sustain the interest of their students and to make the most effective use of time. They are also adept at engaging students and adults to assist their teaching and at enlisting their colleagues' knowledge and expertise to complement their own.

Accomplished teachers command a range of generic instructional techniques, know when each is appropriate, and can implement them as needed.

They are as aware of ineffectual or damaging practice as they are devoted to elegant practice.

They know how to engage groups of students to ensure a disciplined learning environment, and how to organize instruction to allow the schools' goals for students to be met. They are adept at setting norms for social interaction among students and between students and teachers. They understand how to motivate students to learn and how to maintain their interest even in the face of temporary failure.

National Board Certified Teachers can assess the progress of individual students as well as that of the class as a whole. They employ multiple methods for measuring student growth and understanding and can clearly explain student performance to parents.

(4) Teachers think systematically about their practice and learn from experience.

National Board Certified Teachers are models of educated persons, exemplifying the virtues they seek to inspire in students—curiosity, tolerance, honesty, fairness, respect for diversity and appreciation of cultural differences—and the capacities that are prerequisites for intellectual growth: the ability to reason and take multiple perspectives, to be creative and take risks, and to adopt an experimental and problem-solving orientation.

Accomplished teachers draw on their knowledge of human development, subject matter and instruction, and their understanding of their students to make principled judgments about sound practice. Their decisions are not only grounded in the literature, but also in their experience. They engage in lifelong learning, which they seek to encourage in their students.

Striving to strengthen their teaching, National Board Certified Teachers critically examine their practice, seek to expand their repertoire, deepen their knowledge, sharpen their judgment and adapt their teaching to new findings, ideas and theories.

(5) Teachers are members of learning communities.

National Board Certified Teachers contribute to the effectiveness of the school by working collaboratively with other professionals on instructional policy, curriculum development and staff development. They can evaluate school progress and the allocation of school resources in light of their understanding of state and local educational objectives. They are knowledgeable about specialized school and community resources that can be engaged for their students' benefit, and are skilled at employing such resources as needed.

Accomplished teachers find ways to work collaboratively and creatively with parents, engaging them productively in the work of the school.

SOURCE: Reprinted by permission of the National Board for Professional Teaching Standards, 1996, all rights reserved, from pp. 1-2 of an overview of the standards. The full document is available from NBPTS, 26565 Evergreen Road, Suite 400, Southfield, MI 48076; or 1730 Rhode Island Avenue, NW, Suite 909, Washington DC 20036.

In May 1996, the NBPTS issued its first draft of proposed standards for highly accomplished vocational education teachers. The draft standards were developed by a committee who drew from the literature and their experiences a new vision for vocational education, knowledge about the changing demands of the workplace, new information on teaching and learning—especially as related to adolescents, and new knowledge about accomplished teaching. The draft standards were reviewed by teachers, scholars, state and local officals, organizational leaders, business and industry persons, and others across the country. Based on that review, they were revised by the Vocational Education Standards Committee in Decembe. 1996. The revised standards (Exhibit 2) are scheduled to be presented for approval to the NBPTS in early 1997.

Each of the 13 standards states one aspect of accomplished vocational education teaching and is couched in terms of observable teacher actions that have an impact on students. The Vocational Education Standards Committee of the NBPTS has provided extensive elaboration of each of the standards along with an explanation of what teachers need to know, value, and do in order to satisfy the standard at a high level. "This includes descriptions of their orientation to students, their distinctive roles and responsibilities, and their stance toward a range of ethical and intellectual challenges that regularly confront them" (p. 14).

It is important to note that the standards are in draft form at this time. It is anticipated that a (possibly revised) set of standards will be approved by the NBPTS sometime in 1997.

Principles of Vocational and Technical Teacher Education

If teachers are to master the initial teaching standards identified by INTASC (figure 5) and the advanced standards and outcomes proposed by NBPTS (Exhibits 1 and 2), then vocational teacher education must redesign its programs to ensure that appropriate knowledge and processes are included to prepare its students who will become initial and highly effective teachers.

In collaboration with faculty colleagues from universities throughout the country, Lynch (1996b) developed 10 principles of vocational and technical teacher education (figure 9) and

Exhibit 2
Vocational Education Standards for National Board Certification (Draft)

Creating a Productive Learning Environment

I. Knowledge of Students

Accomplished vocational teachers are dedicated to advancing the learning and well-being of all students. They personalize their instruction and apply knowledge of human development to best understand and meet their students' needs.

II. Knowledge of Subject Matter

Accomplished vocational teachers command a core body of general vocational knowledge about the world of work in general and the skills and processes that cut across industries, industry specific knowledge, and a base of general academic knowledge. They draw on this knowledge to establish curricular goals, design instruction, facilitate student learning and assess student progress.

III. Learning Environment

Accomplished vocational teachers efficiently manage their classrooms and create an environment that fosters democratic values, risk taking and a love of learning. In this environment, students develop knowledge, skills and confidence through contextualized learning activities, independent and collaborative laboratory work, and simulated workplace experiences.

IV. Diversity

Accomplished vocational education teachers create an environment where equal treatment, fairness, and respect for diversity are modeled, taught and practiced by all, and take steps to ensure quality vocational learning opportunities for all students.

Advanced Student Learning

V. Advancing Knowledge of Vocational Subject Matter

Accomplished vocational teachers foster experiential and performance-based student learning of vocational subject matter by creating important, engaging activities for students that draw upon an extensive repertoire of methods, strategies and resources. Their practice is also marked by their ability to productively integrate vocational and academic disciplines.

VI. Assessment

Accomplished vocational teachers utilize a variety of assessment methods to obtain useful information about student learning and development, to assist students in reflecting on their own progress and to refine their teaching.

Transitioning to Work and Adult Roles

→ **VII. Workplace Readiness**
Accomplished teachers develop student career decision-making and employability skills by creating opportunities for students to gain understanding of workplace cultures and expectations.

→ **VIII. Managing and Balancing Multiple Life Roles**
Accomplished teachers develop in students an understanding of the competing demands and responsibilities that are part of the world of work, and guide students as they begin to balance those roles in their own lives.

→ **IX. Social Development**
Accomplished vocational teachers develop in students self-awareness and confidence, character, leadership and sound personal, social and civic values and ethics.

Professional Development and Outreach

→ **X. Reflective Practice**
Accomplished vocational teachers regularly analyze, evaluate and strengthen the effectiveness and quality of their practice through lifelong learning.

→ **XI. Collaborative Partnerships**
Accomplished vocational teachers work with colleagues, the community, business and industry, and postsecondary institutions to extend and enrich the learning opportunities available to students and to ease school-to-work transitions.

→ **XII. Contributions to Professional Community**
Accomplished vocational teachers work with their colleagues and with the larger professional community both to improve schools and to advance knowledge and practice in their field.

→ **XIII. Family and Community Partnerships**
Accomplished vocational teachers work with families and communities to achieve common goals for the education of all students.

SOURCE: Reprinted by permission of the National Board for Professional Teaching Standards, 1996, all rights reserved, from pp. 22-24 of a draft of the standards. The full document is available from NBPTS.

Vocational and Technical Teacher Education Faculty

Principle #1. Faculty are committed to their students and to students' professional development as lifelong learners.

Principle #2. Faculty use curriculum and instructional techniques to integrate theory with practice, academic and work force education, professional education and subject matter, and learning theory and work force preparation.

Principle #3. Faculty understand the philosophy, contemporary concepts, research, effective practice, and methods of inquiry related to work force preparation and development.

Principle #4. Faculty use dynamic pedagogy, based on learning theory and practices appropriate for youth and adults.

Principle #5. Faculty are partners in learning communities through which they model collaboration and democratic processes for their students.

Vocational and Technical Teacher Education Programs

Principle #6. Programs are dynamic and change oriented.

Principle #7. Programs are grounded in academic education, workplace subject matter, workplace processes, technology, professional education and pedagogy, and clinical experiences.

Principle #8. Programs reflect cultural diversity.

Vocational and Technical Teacher Education in Colleges and Universities

Principle #9. Colleges and universities and their inherent administrative structure that offer programs to prepare vocational and technical teachers are committed to such preparation and provide adequate resources to sustain them at high quality level.

Principle #10. Colleges and universities provide a clearly identified group of academic and clinical faculty for whom vocational and technical educator preparation is a top priority.

Figure 9. Principles of vocational and technical teacher education

SOURCE: Lynch (1996b), pp. 77-87

related narrative to undergird the redesign of vocational teacher education. The principles can serve as a basis for developing programs, curriculum, and practices to enhance high quality teacher education for teachers of work-based programs. The principles are considered to be the essential origin of truth, law, or rule upon which standards are to be developed and evaluated and practices and future actions are encouraged. The principles are necessarily general, but they serve as guidelines for further development of a "philosophical and conceptual framework for teacher education, performance-based. standards, effective practices, and criteria by which to assess, accredit, license, and certify programs, students, graduates, and faculty in vocational and technical teacher education" (Lynch 1996b, pp. 74-75).

The principles are influenced heavily by the work of various commissions or groups briefly described in Table 3 and the literature that has posited reform in the education by youth and adults who are in need of initial and continuing education and training to perform successfully in contemporary workplaces (Lynch 1996b).

Implications for Work-based Teacher Education

This has been a century of unprecedented change: changes in workplaces, changes in the nature and diversity of the work force, changes in skills needed by workers, managers, and owners, and changes in the very assumptions underlying the way in which work is organized and managed. Whatever the examples—from horse and buggy to supersonic travel, from the telegraph to the World Wide Web, from assembly lines to quality circles, from a production to a service economy—the cumulative effects of change have brought about national and global interdependence and interconnectedness that require different assumptions, different skills, and a different education for most people in most places.

Concomitantly—albeit perhaps much more slowly—educators have turned attention in the past 15 years to necessary changes in teaching and schooling. We continue to learn more today than in previous decades about how all youth learn, can be taught to learn more, and about systems and strategies that can be nurturing and accommodating to help them learn even more. Increasingly, research is helping us to know, for example, about preferred learning styles, procedures to diagnose learning preferences and problems, authentic assessment, motivational and instructional strategies, and how to integrate school subjects with real-world contexts. In sum, we know more today about best practices and what works relative to teaching and learning processes.

In the final days of the 20th century, educators are initiating transformational changes congruent with the ways that teaching and schooling are to be delivered to meet the challenges of the 21st century. Among the major tenets learned (perhaps *the* major tenet) is that effective change and learning best thrive where they are supported by collaborative communities. Teams of teachers, other educators, businesspersons, social service personnel, parents, researchers, university faculty, and others committed to youth and their learning are all critical to the success of efforts to improve education.

“Among the major tenets learned (perhaps *the* major tenet) is that effective change and learning best thrive where they are supported by collaborative communities.”

A principal partner in collaborative team efforts must be the universities, including, but not limited to, those primarily

involved with the education of teachers. Even more focused, those at the universities who are primarily involved with the training of vocational and technical teachers must be meaningfully involved—through collaborative processes—with the educational transformation process. But to do so, they are going to have to change their own programs and their own practices.

Several major events occurred in the 1990s to help vocational and technical teacher educators begin to think through and plan for changes in their programs. In drawing on the reform literature, the history and philosophy of vocational education, research on teaching and learning and especially in applied contexts, and their own experiences on college and university campuses and in schools, many university professors and their colleagues began to discuss, confer about, and publish position papers and texts outlining a reform agenda and/or implementation strategies for vocational and technical teacher education. Nearly every report, in its own way, has called for the redesign of vocational and technical teacher education (work-based teacher education). Many other recommendations have been printed and cover the gamut from minor tinkering with traditional programs or processes to a complete overhaul of the system. This section puts forth implications from the reform literature that are thought to be plausible, defensible, and realistic. They are reasonably well documented in the reform literature by researchers and authors who have devoted much energy to charting the future of vocational and technical teacher education. The first part of this section begins with a synthesis of reform themes from recent research and literature.

Synthesis of Reform Themes from Research and Literature

During the previous decade, as highlighted in other sections of this paper, several prominent and relatively well-publicized reports have focused on reform in teacher education and, to a lesser extent, on reform in vocational and technical teacher education. Some of the reports have focused on one or more themes, such as increased academic preparation for all teachers and/or use of more clinical experiences or professional development schools. A few reports, such as the several texts and papers from the Holmes Group, have tended to be more comprehensive and, over a span of years, have addressed a number of issues deemed important by their members. Some of the reports seem well grounded in research and theory; others are perhaps

more radical or visionary in their scope or focus and are based on expert opinion and observation.

Although perhaps oversimplified, there appear to be six themes that are fairly common among most or several of the reports and/or are paramount in the work of several commissions mentioned in this paper. In summary, these themes, posited here as recommendations for reform in teacher education and in vocational teacher education, are as follows.

1. Increase the supply and academic quality of those entering the teaching force. Most reports admonish this country to step up its efforts to recruit high quality people into teaching. Such efforts must attend to recruiting a diverse teaching force; attract outstanding students and individuals from business and industry, military, and other nontraditional markets; and identify exemplary potential teachers and excellent role models from a variety of disciplines and prepare them to teach. This is especially critical in vocational education, where the enrollment decline in teacher education has been so steep and where so many in the teaching force lack the academic credentials of their professional colleagues in the public schools, technical institutes, and community colleges.

2. Set high standards for teacher education programs. This recommendation primarily addresses standards that must be in place in all teacher education programs related to student learning and development, curriculum development, teaching skills, knowledge of educational contexts and purposes, professional knowledge that must be learned, and other aspects of a common core of professional teaching knowledge. What is it all vocational education teachers must know and be able to do before they are issued a license to teach?

3. Improve the academic preparation for teachers. Careful attention must be given to identifying the general education or liberal arts components in teacher preparation programs. This may be especially critical for vocational teacher education, as the field struggles with important efforts to prepare teachers to integrate academic and vocational education into the curriculum of all secondary and postsecondary students. Connections must be made between studies in general education (e.g, math, science, language arts, technology), work-related subject matter (e.g., manufacturing, business, agriculture), and work-based learning.

4. Authentically assess teacher education candidates. An important word is authentic—performance-based, relevant, contextual—measures to assess the dispositions, knowledge, skills, and abilities of teachers in training. All reports address the critical need to assure the public of a high quality, competent, well-prepared teaching force.

5. Collaborate with schools, social service agencies, businesses and industries, communities, and other learning environments for educational purposes. Collaboration is paramount in all reports related to reform in teacher education. Collaboration related to teacher education takes many forms: use of public schools for early clinical experiences for students in teacher training, collaborative applied research, professional development of inservice teachers and other school personnel (lifelong learning), use of community experts to meet the unique learning needs of teachers and students, teachers' knowledge of and ability to use resources available in the community, industry- and community-based internships for students and teachers, and so on.

6. Increase funding for teacher education. Several reports address the challenges associated with funding reform in teacher education. It will be more expensive than it has been previously, especially as colleges and universities increase clinical experiences for students, deliver teacher education onsite in schools and other learning environments, increase methods and measures to assess students' knowledge and performance, reform curriculum to include development of technological skills, provide preservice teachers more experience with youth and children at off-campus sites, and tend to the lifelong learning needs of teachers. Certainly, increased funding is especially critical to the redesign of vocational teacher education in the years ahead.

In addition to these six themes, seemingly common to all of teacher education and vocational teacher education, there is one additional theme unique to vocational teacher education. In the various reports specific to reform of vocational and technical teacher education, one theme seems paramount:

7. Create a new vision for vocational and technical teacher education. This recommendation is worded differently in various reports—such as to redefine vocational teacher education, set a new mission for it, research "new" knowledge bases, refocus into work-based learning (or work force development or work force education), or eliminate the narrow, highly specialized programs historically identified with vocational teacher

education. Regardless of nomenclature, it is clear from the reports that significant changes are needed in vocational teacher education. Change must go beyond mere tinkering or minor improvements in curriculum or processes.

A Model for Work-Based Teacher Education Design

A proposed model for the redesign of work-based teacher education (vocational and technical teacher education) is presented in figure 10. The model is drawn from the salient themes, recommendations, and discussions that have emanated from recent contemporary reports on reform in teacher education generally and vocational education specifically.

Philosophical Foundations for Work-Based Education

The current philosophical underpinnings of the preparation of teachers for work-based education programs (vocational teacher education programs) have been postulated by Miller (1996). He calls for a unifying philosophy in teacher education, guided by contemporary practices in vocational and technical education programs, knowledge of the nature of learners, and contemporary practices in workplaces.

Based on critical analysis of the work of several researchers and practitioners who have analyzed contemporary or preferred practices in programs of work-based education and/or postulated reforms, Miller (1996) declared that the philosophical position of vocational education (i.e., work-based education) today is pragmatism. The corresponding education theory of constructivism parallels Miller's declaration of pragmatism as the prevailing philosophy.

According to Miller (1996), the pragmatist/constructivist views reality as constantly changing. Teachers grounded in pragmatism recognize that students have a set of unique experiences they bring to classrooms and workplaces. Teachers are not in classes just "to teach," but to help students draw upon and reconstruct their experiences, create meaning, change, and become all that they are capable of becoming. The teacher's role is not to impart and pass out knowledge to "blank slates" but to provide opportunities that will help students build on previous

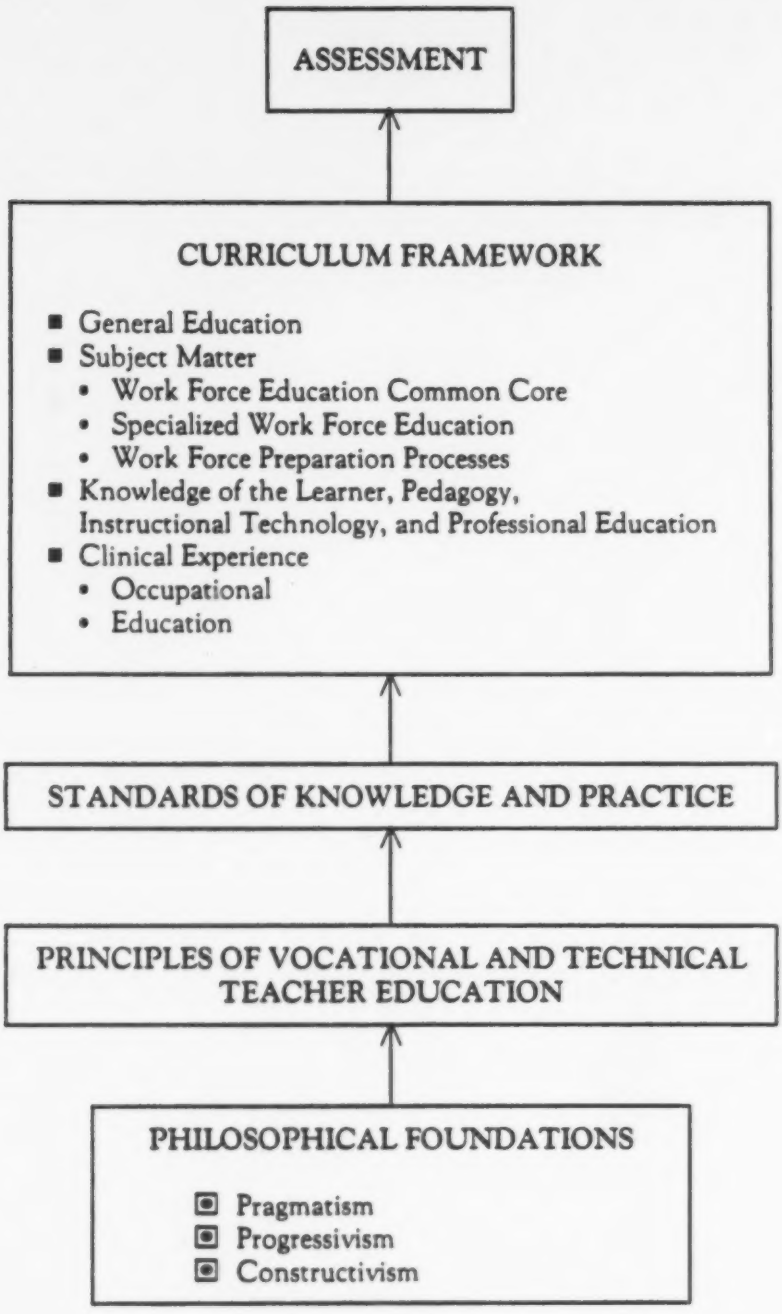

Figure 10. Model for work-based teacher education design

experiences, make connections, and construct new meanings with each advance in knowledge. The teachers help learners set goals and then help to organize and facilitate the content and processes necessary to achieve the goals.

Parallel with the contemporary theory of constructivism, the pragmatically grounded teacher is a facilitator rather than a dispenser of knowledge. The emphasis on pragmatism is on change, learning by doing, and learning as a lifelong activity for students and teachers alike. Schooling is part of democratic existence where education is a public duty and a means of socialization. Pragmatists believe that schools and teachers should provide opportunities for students, including those in work-based education programs, to become problem solvers, collaborators, makers of meaning, lifelong learners, change agents, and practitioners of democratic processes.

Miller's version of pragmatism naturally includes the preparation of teachers—as learners—who in turn will work with students—as learners—in secondary and postsecondary public schools and other work-based learning environments (e.g., industry-based education programs, proprietary schools, job corps centers, correctional institutions, and vocational rehabilitation). Teachers, too, are to be prepared themselves to become problem solvers, makers of meaning, lifelong learners, change agents, and practitioners of democratic processes. College and university teacher educators and faculty are to organize the content and processes to facilitate transition from relative dependence by students in teacher education into independence.

"It is hoped that work-based teacher education of the 21st century will become much more congruent with the original tenets of Dewey and less with those of Prosser."

Thus, it is hoped that work-based teacher education of the 21st century will become much more congruent with the original tenets of Dewey and less with those of Prosser. Dewey's original work is remarkably similar to the contemporary writings of constructivism. Drawing on pragmatism/progressivism, teacher education today will build on students' unique experiences and allow course content and processes to evolve and change around the experiences of class members. Students' goals will be meaningfully considered along with the knowledge/processes (i.e., the knowledge bases) that must be learned in their journey to become effective work-based education teachers. Teacher education programs will become more democratic, allowing preservice teachers and graduate students opportunities to make more choices and to develop creative, problem-solving abilities. Faculty will rely on discovery-learning approaches and then integrate much more carefully theory and practice into their class and clinical activities. Teaching through facilitation rather than

lecturing will be modeled, and students will be given ample opportunities to practice those skills actively with their classmates ("team") and then with their own students in schooling contexts. The design of work-based teacher education will be much more contextual with considerable field-based experiences and, similar to the thoughts of Dewey, the Holmes Group, and others, will include today's version of professional development schools. For work-based teacher education purposes, such partnership schools will include middle and high schools, vocational centers, magnet schools, technical institutes, community colleges, and other environments emphasizing work-based learning (e.g., job corps centers, proprietary schools, and adult skill centers).

Principles of Teacher Education for Work-Based Programs

The principles of vocational and technical teacher education presented in figure 9 and their related narrative (Lynch 1996b) should be carefully considered in the design of any program focused on educator preparation for work-based education programs. Based on assumptions underlying progressivism, pragmatism, and constructivist theory, these 10 principles serve as the foundation for developing programs, curriculum, and practices to enhance high quality teacher education for work-based programs.

The principles are influenced by the work of the various commissions or groups summarized in Table 3 (e.g., NCATE, Vocational Education Standards Committee of the NBPTS, INTASC); from the literature that has posited reform in the education of youth and adults who are in need of initial and continuing education and training to perform successfully in contemporary workplaces; and from empirical research on learning and effective teaching practices.

Standards

The next step in the proposed model for redesigning vocational teacher education programs is to set the standards for such programs. Standards are often written in different ways, with different measures, and with a wide variety of criteria used to evaluate achievement of the standard. Generally, though, standards are an acknowledged measure of comparison for quantitative or qualitative value. They constitute the norm, the expectation,

the level of approval or acceptance, or the definition of acceptable by various audiences.

Standards are sometimes developed for institutions, such as those used by NCATE to accredit units of teacher preparation at the nation's colleges and universities. Others have been developed for large groups. All beginning teachers, for example, are expected to meet the standards established by INTASC (figure 5). Experienced vocational education teachers who wish to earn national board certification must meet the (draft) standards set forth by the NBPTS (Exhibit 2). Other standards have been developed for teacher education by programs within traditional disciplines, such as those developed by the National Council of Teachers of Mathematics. Some standards have been developed by state agencies for use in preparing teachers and other educators; others are developed locally, either at the unit, program, or course level.

It is hoped that vocational and technical teacher education will begin to draft model or exemplary standards for its teacher preparation programs. This should include standards by which units in work-based or vocational and technical teacher education will be evaluated and the standards by which the performance of its graduates will be assessed. The field needs to define carefully and comprehensively what it expects its teachers to know and do and how they are going to be evaluated and assessed on their professional knowledge and skills.

“The field needs to define carefully and comprehensively what it expects its teachers to know and do and how they are going to be evaluated and assessed on their professional knowledge and skills.”

Curriculum Framework

Perhaps the most challenging aspects of the redesign of vocational and technical teacher education into a more contemporary work-based teacher education program will be in the design and shaping of the curriculum offered to teacher education students, both at the preservice and graduate levels. The recent literature on vocational and technical teacher education reform does not address curriculum reform very well, only in a sketchy way and often quite tepidly.

The issue of curriculum or course detail probably looms mightily in the minds of those responsible for redesigning teacher education programs and those responsible for teaching it. What must those involved with work-based teacher education need to know to sit credibly at the table of professional educators? How do they come to know it? How is such knowledge generated and

confirmed? What must teachers know about teaching? What knowledge is essential about work-based education? How do teachers integrate academic and vocational education? How do you learn all of this (and more)?

It is also important to note at the outset that curriculum redesign for work-based teacher education is even more complicated based on how practitioners view the field. As discussed by Copa and Plihal (1996), some continue to view vocational and technical education as a collection of separate technical fields such as agriculture, business education, trade and industrial education, and health occupations. Therefore, teacher education programs should be similarly designed. Accordingly to Lynch (1991), this was the design until the late 1980s in nearly all vocational teacher education programs throughout the country. In these specialized teacher education program designs, general education and subject matter components are focused on the specialized education and training needed in a particular occupation or technical field. The curriculum is based primarily on the needs of business and industry. Others see the field much more broadly and believe education programs ought to concentrate on work-based learning much more generically. Such a view focuses on the learner as central in education and prepares him or her to deal broadly with contemporary challenges in workplaces, families, and communities (Copa and Plihal 1996). The debates and discussions continue!

With all due respect to the works of such noted curriculum theorists and educational philosophers as John Dewey, Jean Piaget, Edward Thorndike, Harry Broudy, Jerome Bruner, Howard Gardner, Maxine Greene, John Goodlad, Lee Schulman, Gary Fenstermacher, Ralph Tyler, Lauren Resnick, as well as the recent voices from those speaking and writing about vocational and technical teacher education such as George Copa, Nancy Hartley, Melvin Miller, Kenneth Gray, Mildred Griggs, Frank Pratzner et al., the following curriculum framework, which stresses attention to general education, subject matter, professional education, and clinical experiences, is offered.

General Education. Broad-based preparation in the liberal arts is a theme that has permeated the teacher education reform literature. Those involved with the design of work-based teacher education have likewise called for a solid preparation in core academic subjects by vocational and technical teachers. "This is crucial if they are to continue in their efforts to integrate successfully academic and vocational education for all students, position themselves as critical colleagues within the education

profession, and acquire the literacy and critical thinking skills associated with effective teaching" (Lynch 1996a, p. 17).

The detail associated with general education requirements for work-based educators has not been researched or debated to any great extent. Some authors have concluded, however, that the general education preparation must be similar in breadth and depth to that expected of all college graduates and certainly for those involved in the teaching profession. On most campuses and in most places, this means that about 40-50 percent of students' initial preparation (i.e., undergraduate) should be devoted to study in the liberal arts. Goodlad (1994) argues that all students must have intellectual encounters with major concepts, principles, and ideas in six knowledge domains. Those domains (with examples) include—

- nature of the human species: history, the arts, literature, psychology, biology, religion, archaeology;
- world as social, political, and economic systems (the social village): anthropology, sociology, economics, political science, ecology, archaeology;
- world as a physical system: mathematics, physics, geology, technology, statistics;
- world as a biological system: biology, zoology, biochemistry, ecology;
- world as a communications and expressive system: native and foreign language, literature, the arts, speech; and
- evaluative and belief systems: philosophy, religion, logic, ethics, history, economics, political science.

Some authors have indicated that prospective work-based education teachers will need essentially the same preparation in some general education subjects as will those who intend to teach those subjects. Thus, for example, if work-based teachers plan to teach their students to use mathematics in solving complex problems related to their vocational programs, the teachers will need today's equivalent of 12 college semester credits of mathematics with related computer applications (Hall, Wilson, and Lynch 1993). It is important to note that such preparation in mathematics could include required preparation in both general education and subject matter components.

The specific requirements in general education will need to be well planned and coordinated with faculty in appropriate units in arts and sciences. The coursework and experiences should reflect applied contexts needed by vocational and technical education teachers. "These contexts may include instruction and

practice in the processes related to both contemporary workplaces and educational environments" (Lynch 1996b, p. 83).

Subject Matter: Work Force Education Common Core. There seems to be a small, but growing body of literature that essentially supports work-based education subject matter as grounded in theory and practice in three subareas: common core, specialized subject matter, and work force preparation processes. The common core is general knowledge about contemporary workplaces and employability skills that are to be learned by all students in teacher education programs who intend to teach secondary or postsecondary students involved with work-based education programs. This is generally thought of as common knowledge about the world of work, workplaces, work forces, industries, occupations, and employer, worker, family, and community relationships. It includes vocational and career development theory, work ethics, customer and client relationships, sociology and economics of the workplace, and leadership and management training.

Subject Matter: Specialized Work Force Education. The specialized work force education subject matter consists of knowledge that the prospective teacher needs to know to teach specialized skills and knowledge to students enrolled in secondary or postsecondary vocational and technical education programs. Specialized knowledge and skills are typically acquired for a particular skill, industry, or occupational cluster. The teacher will then teach that specialized skill(s) or industry cluster as a subject in a secondary or postsecondary institution.

To teach a specialized skill or occupational cluster, the prospective teacher acquires considerable depth and breadth in a subject typically identified with a college major, an industry, or in a highly specialized technical field. The specialized subject matter is usually studied from a professional school other than education and/or is acquired through paid occupational experiences or clinical internships. The specialized subject matter preparation to underpin teacher education is similar to the specific occupational cluster area or courses the work-based teacher will teach. A collage of examples of various programs, majors, or career clusters that are currently being offered or proposed to be offered in secondary and postsecondary vocational education specialized programs is shown in figure 11. Typically, these relate to programs or courses that are being offered in such work-based learning environments as high schools, vocational centers, technical institutes, and community colleges.

FROM TENNESSEE: Career Clusters

- Arts Design and Communication
- Business and Office
- Construction
- Education and Related
- Health
- Industrial Production and Related
- Mechanics and Repairers
- Sales
- Science
- Service
- Social Science
- Transportation

FROM OKLAHOMA: Occupational Clusters

- Manufacturing
- Business and Office
- Personal Service
- Education
- Sales
- Construction
- Transportation
- Agriculture
- Repairers and Mechanics
- Health
- Social Sciences
- Communications and Art
- Science and Technical Occupations

FROM OREGON: Career Majors

- Human Resources
- Manufacturing
- Health Services
- Business and Management
- Natural Resources
- Tourism and Trade

FROM GEORGIA: Programs of Study

- Art and Humanities
- Business, Marketing, and Information Management
- Environmental and Agricultural Sciences
- Health and Medical
- Human Services
- Technical and Engineering

FROM NEW YORK CITY SCHOOLS: Career Clusters

- Mechanical, Structural and Electrical/Technical Trades
- Communications
- Ecology
- Technology Education
- Fashion Industry and Design
- Health and Human Services
- Law
- Management and Finance
- Performing and Fine Arts
- Transportation, Tourism, Hostelry
- Mathematics/Science Research
- Humanities
- Business

FROM MAINE: Thematic and Industrial Program Clusters

- Biology, Conservation, and Agribusiness
- Computer Science, Software Engineering, and Word Processing
- Economics, Business Administration, and Marketing Education
- Genetics, Medicine, and Health Technology
- Psychology, Education, and Day Care
- Sociology, Human Services, and Occupational Home Economics
- Jurisprudence, Criminal Justice, and Law Enforcement
- Architecture, Civil Engineering, and Building Construction
- Physics, Mechanical Engineering, and Auto Mechanics
- Electronics, Production Engineering, and Industrial Arts
- Art History, Fine Arts, and Graphic Arts
- Literature, Journalism, and Technical Writing
- Geography, Land Use Planning, and Cartography
- Oceanography, Nautical Engineering, and Fishing

Figure 11. Examples of possible specialized work force education programs

Implications

FROM U.S. DEPARTMENTS OF EDUCATION AND LABOR: National Skill Standards Projects, Industry Areas

- Advanced Manufacturing
- Agriscience/Biotechnology
- Heating, Air Conditioning, and Refrigeration Occupations
- Automotive, Auto Body, and Truck Technicians
- Bioscience Industry
- CADD (Computer-Aided Drafting and Design)
- Chemical Process Industries
- Electrical Construction
- Electronics
- Food Marketing Industry
- Hazardous Materials Management Technician
- Health Science and Technology
- Heavy Highway Utility Construction and Environmental Remediation
- Hospitality and Tourism
- Human Services
- Industrial Launderers
- Metalworking
- Photonics Technician
- Printing
- Retail Trade
- Welding Occupations

FROM NATIONAL BOARD FOR PROFESSIONAL TEACHING STANDARDS: Subfields for National Board Certification in Vocational Education (Draft)

- Agriculture and Environmental Sciences
- Arts and Communication
- Business, Marketing, and Entrepreneurship
- Family and Consumer Sciences
- Health Services
- Human Services
- Manufacturing and Engineering Technology
- Technology Education

FROM SWEDEN: Upper Secondary School National Programs

- Childcare and Leisure
- Construction
- Electricity
- Energy
- Aesthetic
- Transport Technology
- Trade and Administration
- Handicrafts
- Hotel and Restaurant Trades
- Industry
- Foodstuffs
- Media
- Land and Animal Husbandry
- Natural Sciences
- Health Care
- Social Sciences

Figure 11. Examples of possible specialized work force education programs (continued)

Not all work-based education teachers would necessarily need or want specialized college subject matter preparation or extensive breadth or depth in a particular occupational cluster or skill area. Rather, subject-matter preparation for these teachers would be grounded in common core content and work force preparation processes. Such teacher preparation is compatible with the recommendations from the National Assessment of Vocational Education and several reform reports that have called for a broader conceptualization of vocational education, especially at the high school level.

Subject Matter: Work Force Preparation Processes. This involves the acquisition of various knowledge and skills identified with processes used to prepare youth and adults for the workplace. Typically, college curricula will consist of knowledge

and experiences for all teacher education students related to establishing and maintaining high quality apprenticeship and other school-to-work programs, tech prep, community service, integrating academic and vocational education, use of laboratory-based education programs, simulations, workplace mentoring, school-based enterprises, clinical internships, technology applications in workplaces, etc.

Knowledge of the Learner, Pedagogy, Instructional Technology, and Professional Education. This broad area of the curriculum framework is the crux of the teacher preparation program. It is the area in which much of the theoretical and action research in teacher education has taken place in the past quarter of a century. Knowledge bases in this arena have exploded enormously. Researchers simply know much more today about how youth and adults learn, remember, perceive, transfer knowledge to ill-structured situations, solve problems, and so forth. Knowledge of cognition and research emanating from the work of cognitive scientists have the potential to improve enormously the professional education of teachers.

This must become a critical area of study for tomorrow's work-based education teachers. The evolution in the past 20 years from a behaviorist to a cognitive theory of learning has resulted in significant recommended changes to instructional approaches (Biggs, Hinton, and Duncan 1996). In effect, relatively new theories and research findings in cognition imply a transition to some very different learning systems than those historically practiced in public education, including vocational education. Some fundamental assumptions about how students learn, and about how teachers should teach, have been reversed with increased knowledge about cognition, thinking development, transfer, understanding, generative knowledge, motivation, self-regulation, memory, and problem solving. For example, the historical practice of using government-developed, fairly detailed, and competency-based curriculum and then have students practice "it" (i.e., the skills), repeat, and practice them some more simply is insufficient to develop students' abilities to compete in today's complex workplaces.

In addition to the extensive knowledge about learning and the pedagogical manifestations of it, work-based education teachers will need to increase their knowledge of technology and its applications to education. This includes being able to use today's basic technological skills such as multimedia and electronic presentation, computer operation, word processing, data

management and analysis, electronic communication, use of hardware and software packages, and related ethics and impacts.

Professional education also must include knowledge about educational ends, purposes, and values and their economic, historical, and philosophical grounds. Related, more specific knowledge about work-based education and its purposes, values, philosophy, historical grounding, transformation from vocational education, and effective practices are critical to enable teachers to position their programs well within educational contexts. If they are to sustain high quality programs in today's economic and political climate, all work-based and currently employed vocational teachers are going to have to understand well education's governance structure, financing, organizational schema, politics, policy development and policy influences, and its character and culture at all levels (i.e., school-level, community, state, nation, and comparative international systems).

Clinical Experiences. A contemporary cornerstone in the preparation of educators throughout their professional worklife ought to be the use of well-planned and executed clinical experiences. For work-based educators, this will include experiences in both business and industrial settings and in professional education environments. Such experiences ought to begin early in their formal preparation as teachers and continue throughout their professional worklife.

Occupational clinical experiences might include courses or activities for preservice and inservice teachers that are similar to those identified with school-to-work initiatives (e.g., cooperative education, youth apprenticeship, registered apprenticeship, clinical internship, industry practicum, school-based enterprise, job shadowing and observation, and/or community service). Obviously, occupational experiences acquired prior to enrolling in teacher preparation ought to be considered in the overall design of clinical experiences for each preservice student. Updating occupational experience for work-based inservice teachers is critical.

Education clinical experiences should begin early in the preparation of prospective work-based education teachers and continue throughout their professional careers. Such experiences might include observations and assistance (e.g., in classrooms, with parent conferences, at school board meetings, in counselor and administrative offices, in occupational and academic testing), student teaching, peer teaching and coaching, group teaching, reflective practice, and on and on. Clinical experiences may be

short term or extensive. They should be in more then one education environment, for example, in public schools, technical institutes, adult learning centers, community colleges, alternative environments for certain student segments (e.g, vocational rehabilitation, juvenile offenders, alternative schools, prisons), and with students from diverse populations.

Assessment

A final, but critical, component of a model for work-based teacher education must be assessment, a term used here interchangeably with evaluation. Assessment must include both program evaluation and students' progress. Writers about contemporary education assessment admonish program designers always to gather and use both summative and formative information and data. Summative information is primarily used "to enhance decision making for selection, advancement, certification, accreditation, and promotions" (Johnson and Wentling 1996, p. 147). Formative assessment is gathered "as we go" and should be used to adapt, refine, correct, and improve immediately upon program design, teaching methods, content, etc.

Johnson and Wentling (1996) point out that there are several trends in assessment that should have an impact on vocational teacher education programs. Perhaps primary among the trends is the transformation from a testing culture to an assessment culture. This view sees a testing culture as unproductive for teaching and learning purposes and emphasizes an assessment culture where multiple performance measures and criteria are used to assess learning and instruction. Assessment is to be viewed as an occasion for learning and an opportunity to see what needs to be improved to ensure that more learning can occur. Within an assessment culture, criterion-referenced rather than norm-referenced approaches are used. Tests or any performance measures emphasize learning and thinking, require generation as well as selection of responses, and are an ongoing (not just periodic or at an exit point) occurrence. Moreover, in an assessment culture, "the process of performance is valued beyond simple correctness; there are exhibitions of invention, transfer, and inquiry; and the content of assessment is based on what we want students to know and do rather than what is easy to score" (p. 158).

Another trend in assessment is the use of multiple performance assessments. For teacher preparation, this might include, for

example, interviews with youth and children and classroom observations, portfolios of lesson plans and projects, situational tests, computer simulations, review of videotaped behaviors in schools or workplaces, and problem-solving scenarios. Another trend in teacher preparation is the use of the portfolio, which usually contains students' work samples related to course planning and preparation, actual teaching, assessing their students' learning, unique experiences with special students, providing feedback to students, parents, or employers, and professional development. Assessment centers are now being used in some places to select highly effective teachers, school administrators, and even applicants for graduate study (Johnson and Wentling 1996). The assessment centers are in a separate location where people are sent to be tested, often by an external organization or group. The assessment is usually multidimensional and almost always is situational. The belief is that a comprehensive portrait of a candidate's skills and aptitudes, viewed by an unbiased party, will provide a valuable perspective to assessment processes.

Other Implications

In addition to the major implication from the reform literature that calls for a major redesign of vocational and technical teacher education, there are other implications emanating from analyses by task forces, groups meeting at conferences, textbook authors, and empirical research. These implications may not affect greatly the specific program design, curriculum, or instruction provided to professional educators in work-based education, but could have far-lasting impact on the preparation of teachers for tomorrow's work force. Five such implications follow.

1. Baccalaureate Degree Requirement

Consistent with research and literature findings and the resulting recommendation in the recent National Assessment of Vocational Education (Boesel and McFarland 1994), all teachers in vocational and technical education should have earned (at least) a baccalaureate degree prior to beginning to teach in high school and postsecondary schools. The practice of continuing to certify or license beginning teachers with only high school diplomas or less (i.e., a general education diploma) should be discontinued. In general, the "survival skill training" that Duenk, Beidel, and others have written about, which includes

very minimal professional education content, simply is not sufficient for most trade and industrial teachers in most places most of the time. The competency-based "survival" modules that have been developed for use by these inservice teachers are simply not making a difference and are incongruent with contemporary research findings from constructivism and cognitive theories of learning. As a recent study pointed out, "Modern teaching and learning are no longer packageable and require sophisticated approaches to teacher development and to the organization of the workplace" (*Vocational Education Weekly* 1996, p. 2).

This implication for reform in vocational and technical teaching or teacher education is also consistent with the work of Johnson and Summers (1993) and findings from the recent report of the National Foundation for the Improvement of Education (NFIE). Johnson and Summers analyzed 17 studies that examined various characteristics of the schooling experience and subsequent labor market performance of those schooled. Using sophisticated statistical techniques, the authors concluded that the most significantly positive coefficients describing the quality of teachers were descriptive of their education or, more simply put, "better-educated teachers produce more effective employees" (p. 13). The NFIE study also found that professional preparation for teaching, formal certification, and formal induction programs are linked strongly to student achievement. Further, alternative certification routes or "one shot district-determined, short-term programs have little effect on either teachers' or students' growth" (*Vocational Education Weekly* 1996, p. 3).

2. Collaborative Processes

Consistent with the recommendations in nearly all teacher education reform literature, including those posited in vocational and technical teacher education, collaborative processes must be put in place to prepare well the teachers of tomorrow's work force. Faculty of work-based teacher education must collaborate on their own campuses with faculty and staff of arts and sciences, professional education and pedagogy, other professional schools (e.g., business, family and consumer sciences, agriculture), career planning and placement (e.g., for off-campus clinical placements), and various other administrative and academic support offices. They must also collaborate with business and industry, public secondary and postsecondary schools, other work-based education providers, parent and other support

groups, and social service organizations in the preparation of teachers and other professional educators.

The teacher educator guru so long prevalent in vocational teacher education—that is, the itinerant teacher educator or the one- or two-person "department" who taught the prospective teachers everything they needed to know about student learning and teaching—is simply not working very well in the 1990s and is doomed to extinction in the 21st century. Teamwork, collaborative planning, "it takes a village to raise a child," holistic learning, interdisciplinary studies, curriculum design teams, the learning organization, school-university partnerships: these processes are being used to reform teacher education and are thought to be most effective in preparing teachers to teach effectively. The whole unit is responsible for all of its students and is involved in program and curriculum design for all students. Learning comes from a wide variety of sources and not just from one or two teacher educators in a narrowly focused department.

3. Broader Conceptualization of Work-based Teacher Education

For some time, the reform literature in vocational education has been recommending a broader conceptualization of the field. This is especially true for vocational education programs in high schools. Such high school subject-specific programs as agricultural education, distributive education, and trade and industrial education have not been earmarked for funding in federal legislation for nearly 30 years. Specific federal funding in support of consumer and homemaking education has recently been eliminated. Rather, the U. S. Congress has encouraged a broader conceptualization of vocational or work force education by mandating that federally supported programs include instruction in "all aspects of the industry." This means that all components of industries such as planning, finance, management, labor relations, safety and health, marketing, technology applications, environmental issues, and so forth are to be taught in addition to production and technical skills. Further, Congress has also mandated that much more academic education be integrated into federally supported vocational and technical education programs. Boesel and McFarland (1994) recommended in the latest National Assessment of Vocational Education report to Congress that new systems of work force preparation should broaden the curriculum framework from occupations to industries or other more inclusive constructs. They further

recommended that specific occupational or technical skills be deferred to postsecondary levels of education. Various work-based reports, such as SCANS and ***Workplace Basics***, have also emphasized that new workers need a broad, not narrow, set of skills to negotiate successfully the workplaces of the future.

These recommendations also have implications for work-based (i.e., vocational and technical) teacher education. In the recent book, ***Beyond Tradition: Preparing the Teachers of Tomorrow's Workforce*** (Hartley and Wentling 1996), all authors discussed to some extent this broadened representation of vocational education and implied that the very term "vocational education" needs to be redefined into a more inclusive conceptualization of work force education and development. For teacher education, authors' recommendations included the use of integrated methods classes, integrated academic and work-based learning, removal of traditional occupational alignments, administrative alignment of all traditional occupational fields into one solitary unit related to work force education and development, softening the boundaries between academic and liberal education, close affiliation with professional schools of education, and a common knowledge base to be learned by all prospective work-based education and inservice vocational and technical education teachers.

4. Vocational Teacher Education Commission(s)

Much, much more work needs to be done to reform vocational and technical teacher education in local colleges and universities, in states, and indeed at the macro or national level. As noted by Lynch (1991), little is known about vocational and technical teacher education; research and data about it are "practically nonexistent" (p. 2). It is a field that simply has not researched or studied itself very well. There has never been any agreement about the theory of knowledge to underpin vocational teacher education or the specific knowledge bases that should emanate from this epistemology.

Vocational teacher education reform needs to be addressed further and high quality, valid analysis and guidance given to its constituents. A national commission, perhaps supported by the American Vocational Association and/or the University Council for Vocational Education, needs to begin work on a reform-related agenda. This might be similar, for example, to the work of such related groups as the Commission of Professors of Adult

Education, Academy of Human Resource Development, and the National Council of Professors of Educational Administration.

A major recommendation from the ***Task Force on Vocational Technical Teacher Education*** (1995) was to establish a "commission on professional development" (p. 16) in each state (or region if problem areas cross borders of several states) to develop and promote actions focused on the qualitative improvement of the professional development of educators. The Task Force also provided some guidance as to what each proposed state-level commission should do. Among others, it was emphasized that leadership for reform must be provided, efforts at collaboration must be expanded, and the results of research, development, and exemplary practice to encourage innovation must be used.

5. Lifelong Learning

Increasingly, data and authoritative analysis are verifying that learning to teach is a lifelong endeavor. It takes study, practice, reflection, more study, more practice, more reflection, even more study, and on and on. The knowledge bases about learning, cognition, multiple intelligence, technology applications to learning, classroom management, subject matter, workplaces of the future, and more are exploding. It simply is not possible to learn all that needs to be learned for a lifetime of effective teaching through a baccalaureate, a master's, or a doctoral degree. Thus, increasingly, the culture in work-based education must embrace learning to teach as a lifelong endeavor and recognize continuing education and professional development as simply the norm for the privilege of being able to practice professionally. This culture of continuing education is similar to that embraced by the medical and legal fields.

> **"The culture in work-based education must embrace learning to teach as a lifelong endeavor and recognize continuing education and professional development as simply the norm for the privilege of being able to practice professionally."**

In support of the culture of lifelong learning, the National Education Association has recently recommended that professional development of its members be a high priority issue at the bargaining table in school districts across the country. Among other recommendations, NEA has proposed that the school year for teachers be extended to include 4 weeks for professional development while students are on vacation. NEA and other groups are demanding that professional development be of high quality, substantive, and closely connected with teachers' assignments. The most significant point in this, however, is that studies are consistently showing that the professional competence of the teacher is directly correlated with the success of the student. Simply put, teachers who know what they are doing and

put this knowledge into practice produce students who also know what they are doing and put their knowledge into practice. Professional development needs to be transformed and offered over the lifespan of all educators to ensure student success.

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